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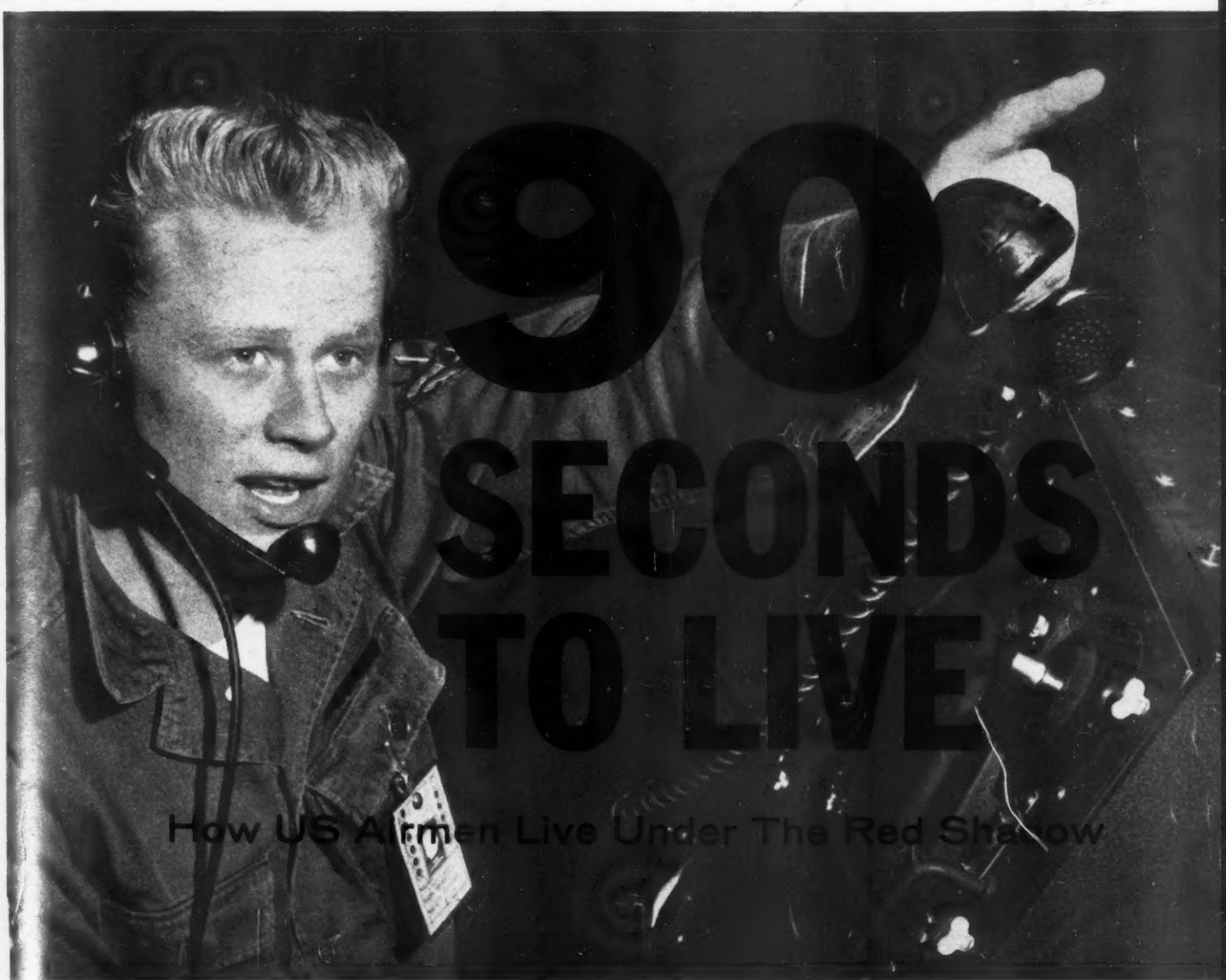

90 SECONDS TO LIVE

How US Airmen Live Under The Red Shadow

ALSO IN THIS ISSUE:

What the Reserve Cut Means • Death of a Colonel

Missilemen at Work

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ARMA'S SECRET WEAPON

Bug hunting . . . failure testing . . . safety factors . . . flight testing—none of these traditional reliability concepts is sufficient to insure maximum performance of missile guidance systems.

We use them all at Arma—but the designer's pencil is our "secret weapon." For true reliability must originate at the design stage—and then be implemented by a full-scale quality control and reliability program. ARMA . . . Garden City, N. Y. A division of American Bosch Arma Corporation.

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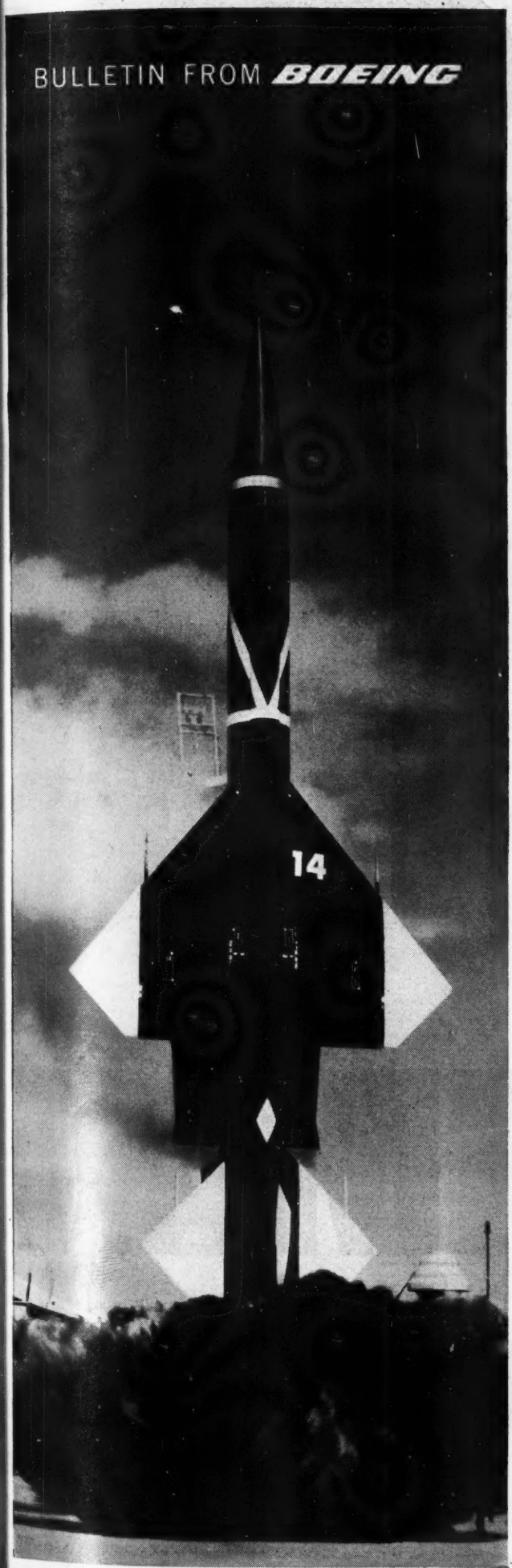
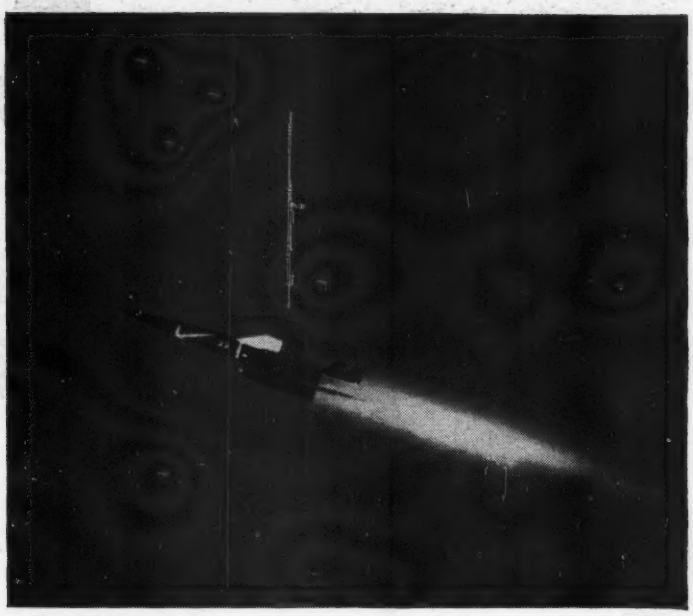
BULLETIN FROM BOEING

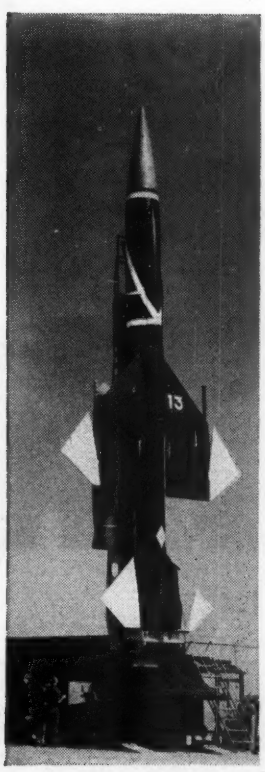




HURTLING through the sky at supersonic speed, Boeing's Bomarc IM-99 interceptor missile is equipped with an electronic guidance system that keeps it on an interception course with the target.

Newest weapon for America's defense—

the Boeing Bomarc interceptor missile



An advanced weapon is being added to the defense arsenal of the nation. The Bomarc IM-99—designed, developed and now being produced by Boeing for the Air Force—is a supersonic missile capable of operating at extreme altitudes.

Bomarc will greatly extend the reach of America's defenses. Superior range enables this missile to shoot down enemy aircraft while still over areas well away from vital targets. Bomarc is an "area" defense weapon as contrasted to short-range anti-aircraft missiles, which are "point" defense weapons.

In addition to the missile itself, Boeing has responsibility for the complete Bomarc weapon system, including launching means, bases, supplies, communications and electronic guidance. Bomarc will be operated by the Air Defense Command.

LEFT. A Boeing Bomarc in firing position. The missile is launched vertically by a liquid fuel rocket motor. When suitable speed is reached, the rocket cuts out and two ramjet engines take over to provide power for supersonic cruise speeds.

BOEING

NAVY
NAVY
NAVY
GRUMMAN

Sum total: 27 years. With many firsts along the way. The first military plane with retractable landing gear. The first carrier-based aircraft with folding wings. First swept-wing jets on operational service with carrier squadrons. First in the air with area-rule (coke bottle) fuselage for fighters. The first aircraft capable of performing the complete search-attack mission against subs. First in amphibians with the production of more such craft than the rest of the world combined. First with two-place transonic jet fighter-trainers.

Sum total: more than 24,000 planes. Ready in quantity when needed. At minimum cost to our government. And backed by unexcelled operational and maintenance field support throughout the world. Small wonder Grumman products have been in uninterrupted service every day of every year since 1930.

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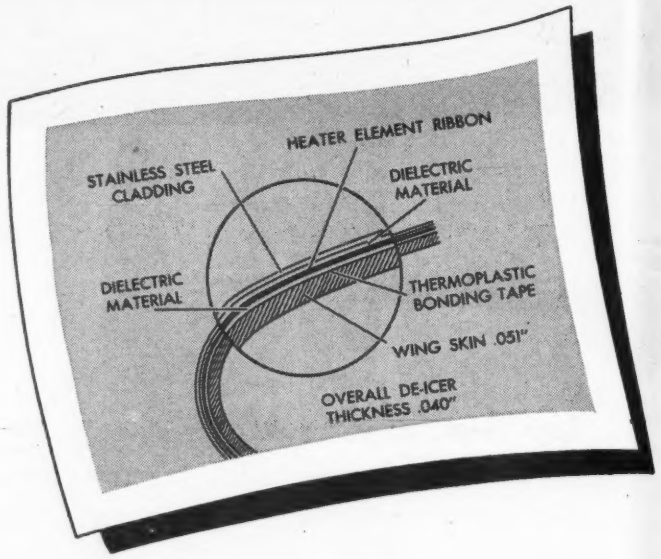
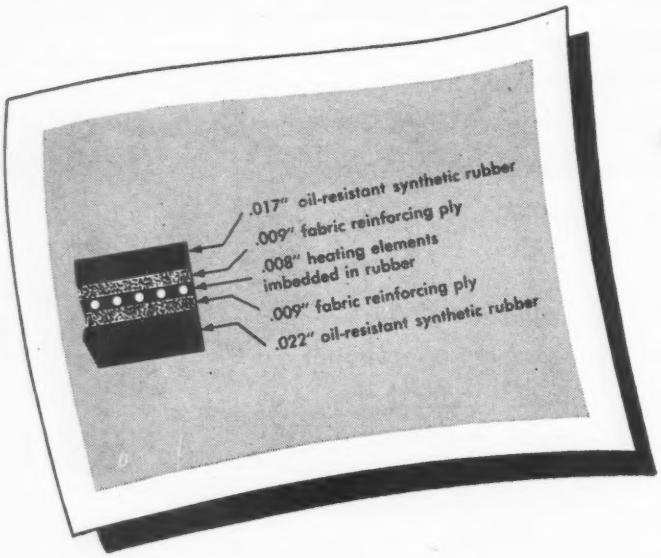
B. F. Goodrich answers de-icing problems 3 ways

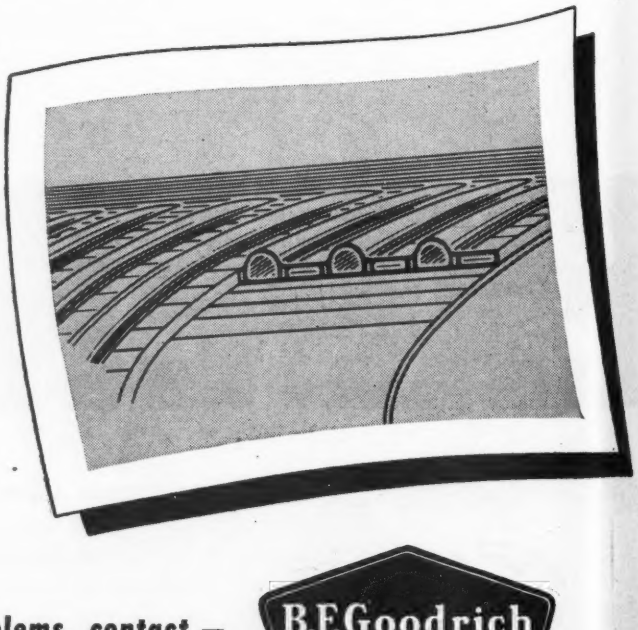
1. METAL-CLAD DE-ICERS — Lightweight B.F.Goodrich metal-clad De-Icers, as used on Boeing's KC-135 stabilizers, are highly resistant to abrasion and erosion from rain and hail. Ribbon-type electrical heating elements are sandwiched between layers of resin-impregnated glass fabric, topped by an exterior skin of stainless steel or other specified metal. Pre-shaped to the contour of the airfoil's leading edge, this De-Icer is attached with an adhesive bond.




.017" oil-resistant synthetic rubber
.009" fabric reinforcing ply
.008" heating elements imbedded in rubber
.009" fabric reinforcing ply
.022" oil-resistant synthetic rubber

2. HEATED RUBBER—B.F.Goodrich electrically heated rubber is a lightweight method of supplying heat for ice control in localized areas such as air intakes, cowls, propeller blades and spinners. Typical applications—Lockheed's Constellations and C-130. Heating elements arranged for proper heat pattern are sandwiched between thin, flexible sheets of rubber to fit complex curves or flat surfaces. Power density can be as high as 40 watts psi—overall thickness as small as .030".

3. PNEUMATIC DE-ICERS — B.F.Goodrich Pneumatic De-Icers offer the best method of ice removal for large areas. Small, rubber-reinforced fabric tubes, built in line with the air stream, inflate and deflate to snap off ice. This chordwise tube arrangement used on planes such as Lockheed's Super-Constellation series and the Grumman Albatross, smooths the flow of air over airfoil surfaces during the brief inflation period. This type of De-Icer is also being used on radomes because its pneumatic operation offers minimum interference with the radar signal.



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AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

Volume 40, Number 11 • November 1957

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10 YEARS AGO MARTIN TOOK A CALCULATED LOOK AT THE SKY

This company's strategic position as a prime contractor to our military security, and to our scientific future in the sky, is the result of ten years of planning toward the finest available manpower and facilities in the frontier field of guided missiles.

Some 20,000 hours ago, as the missile flies, America's first operational tactical missile - the TM-61 MATADOR - was nearing the field test stage, and the Martin VIKING research rocket program was already under way.

A new age was being born. And having participated in the delivery, at that time we made a positive decision:

The effective development and growth of tomorrow's missiles and rockets would depend heavily, we said, upon our own ability to engineer and deliver the *total* missile system, complete with launching, guidance and operational facilities, integrally engineered for reliability in the *customer's* hands.

The decision we made was important. For today, 20,000 hours later, Martin's new missile facilities are the most modern in the industry ...the performance record of our products among the finest *in the sky,* where missiles and rockets write the true score.

MARTIN

BALTIMORE·DENVER·ORLANDO

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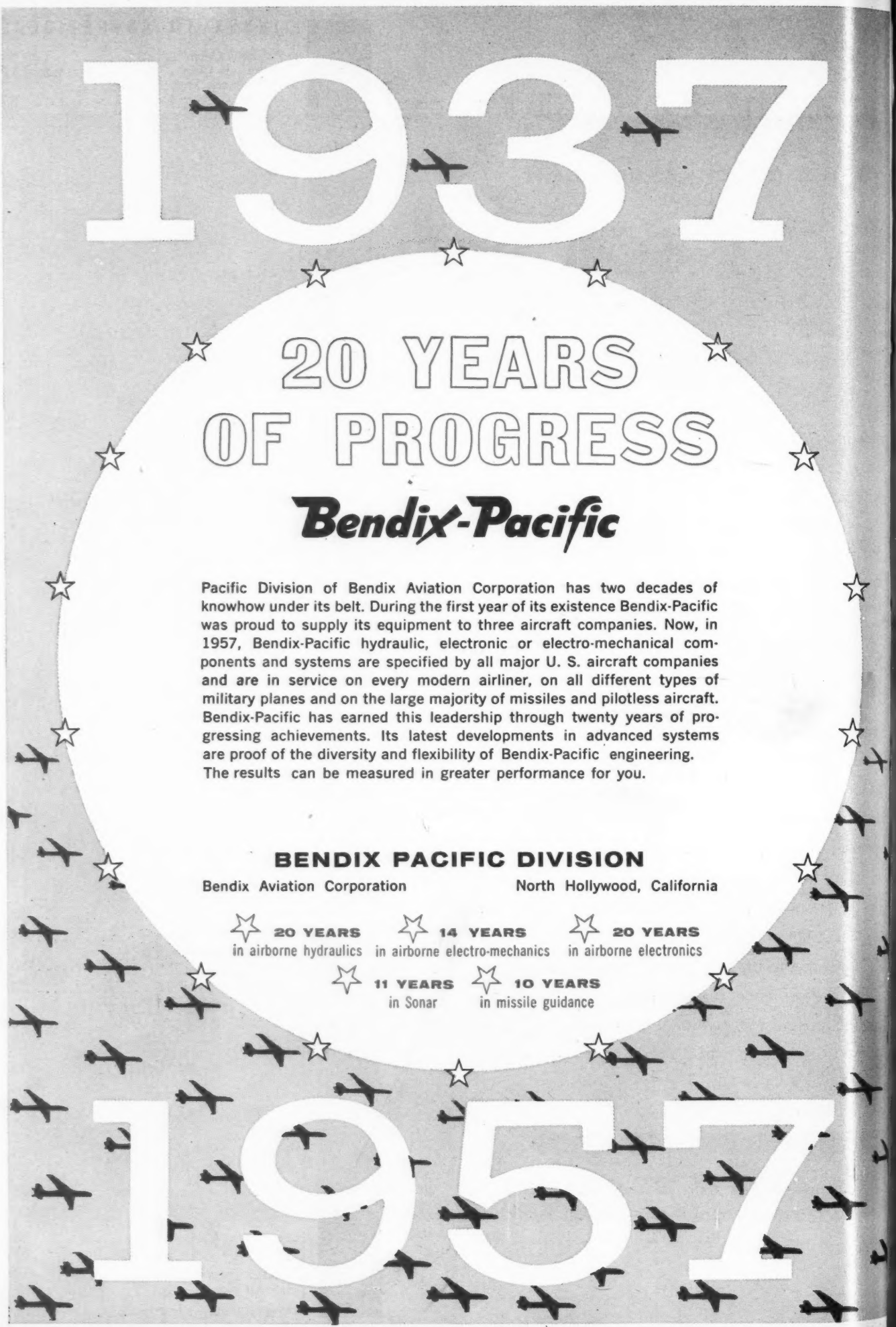
1937
20 YEARS
OF PROGRESS
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in Sonar
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in missile guidance
1957

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We Can't All Be Generals

Was there ever an individual who was completely satisfied with the situation life had dealt him? There may be persons who appear to be content with their lot but if it were possible to see deep down within them one would find a longing for something greater, perhaps a more lucrative position. The minister, although a servant of God, longs for greater sincerity toward his God. Others want greater position in life, desire the power to control others. But for most people this achievement of complete satisfaction of self is never accomplished.

During my fifteen years commissioned service in the Air Force I have seen many of my contemporaries climb the ladder to colonel while I have remained a major. At first the situation worried me and I even considered leaving the Air Force for something better. Something better? What is better than the Air Force? Where can a man have greater prestige? Everywhere men gripe about their wages, the small amount of pay they draw each month. Civilians, airmen, and, if it means anything, colonels gripe, too. If the truth were actually known, I expect a few generals aren't too happy about their pay scale either, yet they, in most cases, keep such matters to themselves.

A colonel once told me that when he was a lieutenant colonel he looked forward to the day he would make full colonel because his money matters would be solved. But after he had been promoted he found that he could barely live on that pay and was looking forward to the day when he would be a brigadier general. Here is a typical example of one who could not adjust to the scale in which he was placed.

I have sat on promotion boards where technical sergeants were interviewed as to their qualifications for promotion to master sergeant. Invariably there were individuals who had met the board many times only to give way to some bright young capable technical sergeant who simply overflowed with all of the necessary qualifications for promotion. It was always the same old story with the man who had met the board many times. He simply did not have the qualifications for promotion, and what's more, he would probably never qualify. But you cannot tell an individual point-blank that he doesn't have what it takes to be a master sergeant or a captain. That would be one sure way to ruin what capabilities the individual already possesses. It is one sure way to chase away any initiative he might have, and it certainly would break his spirit for future value to the Air Force.

Many officers I have known have remarked that in a certain number of years they intend to be colonels. These certainly are noble, ambitious desires, but practically all of these officers lie in the so-called "hump" areas and fully realize that in the not-too-distant future promotions to the grade of lieutenant colonel and colonel will be almost things of the past. There simply will not be enough room at the top to accommodate all of us. What, then, is the solution? There *is* one, but promotion and monetary advancement are not the answer. The answer lies in one's self. The answer is in man's individual mind if he will but consider it and heed the gains it has to offer. I am not advocating that man cease to consider promotion as the reason for his remaining in the Air Force but to consider the advantages he now has, the reward for achievement which has already been cast his way.

We can't all be generals and colonels and master sergeants. As a matter of fact, we can't all belong to the Air Force. Consider the number of individuals who would like to qualify for enlistment but haven't the qualifications. Consider the men who would attend an Officer Candidate School or the Air Force Academy but for the rigid qualifications required for enrollment. Consider that many who are selected are not retained.

The Air Force does not deliberately fail to promote a man. The individual usually makes his own bed, so to speak, and he must lie in it. If we were to analyze ourselves we might

(Continued on page 12)

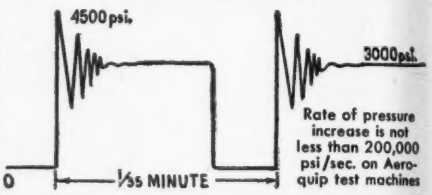
Aeroquip

Engineering Notes

B. A. MAIN, JR.

The advertisement at the right reveals a new construction for high pressure hose of Teflon. Naturally there is a reason for going to this type of construction and I'll try to show here why we did it.

The most widely used measuring stick for evaluating high pressure hose is the impulse test. In this test, the hose line is subjected to hydraulic impulse pressure varying from 0 pressure to 3000 psi., with a surge peak pressure which reaches 4500 psi. The pressure curve shape is shown below:



Rate of pressure increase is not less than 200,000 psi/sec. on Aeroquip test machines

A hose line is considered adequate if it will withstand 100,000 cycles or applications of this pressure curve, and in the case of hose of Teflon, the fluid in the hose and the ambient air surrounding it must be held at 400° F.

We began this development by building and testing hoses using conventional two-wire braided reinforcement around the inner tube of Teflon. In the -4 size, two wire braids proved to be adequate reinforcement to withstand the impulse test, each time samples were tested.

In the -6 size, we tested many constructions of two-wire braided hose of Teflon. We explored both 302 and 304 stainless steel wire in sizes from .011" to .015" diameter. We also explored the use of carbon steel wire for the inner braid using various wire sizes. Twelve separate impulse tests involving hundreds of samples were necessary to investigate all combinations; in every case one or more samples failed before completing the 100,000 cycles of impulse. Our experience with the -8 size paralleled that with the -6 size.

The failures always begin with the inner braid. Here, individual wires break at the crossovers which are formed when wires are first brought over and then under other wires in braiding. As soon as a sufficient number of the individual wires break, the hose bursts during the test.

The obvious solution to this problem was to eliminate the crossovers of braiding by substituting the two spiral wire wraps for the inner braid. This required new machinery and techniques, but we now produce the hose successfully.

We have now finished six separate impulse tests successfully on the -6 and -8 sizes. The samples tested have included both carbon steel wire and stainless steel wire for the spiral wraps and both wires passed the 100,000 cycles every time.

Work on this project has convinced me that it is impossible to build a braided hose size -6 and larger which will withstand this impulse test every time the hose might be subjected to the test.

In our tests of the -6 size we did have two successful tests of braided hose, but when these were retested the samples failed, so you can't judge by one test alone.

The spiral construction provides the best high pressure hose available today. It can be used at the same bend radii as equivalent two-wire braided hose, and compares nearly exactly in weight and size.

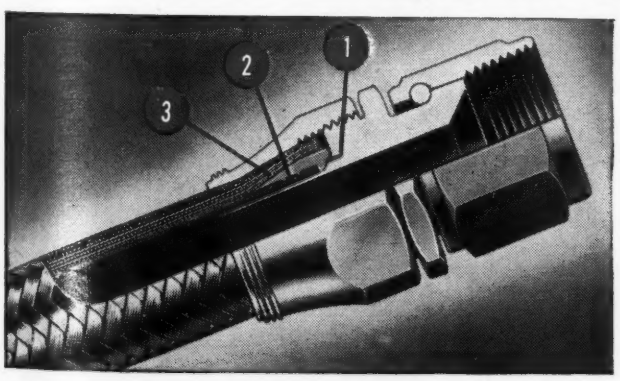
B A Main Jr

VICE PRESIDENT, ENGINEERING
AEROQUIP CORPORATION

SPIRAL WRAP
adds lasting strength
Stainless steel wire is closely wrapped at a precise angle to form a smooth reinforcement layer. This prevents brinelling of the tube, eliminates wire stress concentration common in braided reinforcement and provides optimum strength and flexibility. Outer cover is stainless steel wire braid. Tube of Teflon is distinctive Aeroquip red.

Specify Aeroquip 677 Hose of TEFLON* and Reusable "*super gem*" Fittings for 3000 psi. Systems

GET ALL THESE IMPORTANT ADVANTAGES:



Leakproof, too! This cutaway view shows how Aeroquip "*super gem*" Fittings protect against leakage at all pressures: **(1)** a metal-to-metal line seal; **(2)** a lip seal formed by the tube of Teflon seated, but not compressed, between the nipple and sleeve. Compression of wire reinforcement **(3)** assures positive grip and lasting protection against fitting blow-off.

*DuPont trade name for its tetrafluoroethylene resin.
"*super gem*" is an Aeroquip Trademark.

Hose Strength that lasts and lasts! The secret is in the hose construction perfected by Aeroquip . . . multiple spiral wrap reinforcement that resists impulse fatigue and prolongs the life of the hose line.

Reusable "super gem" Fittings that cut costs! Fittings are often the most expensive part of a hose line, well worth saving when engineering or production changes call for fluid line alterations. With "*super gem*" Fittings you save ALL, not part, of the fittings. Hose line assembly and disassembly is quick and easy, using ordinary bench tools.

High performance, high temperature hose lines of Teflon especially designed for 3000 psi. aircraft systems by the leading producer of hose lines for aircraft applications. Mail the coupon below for complete information.

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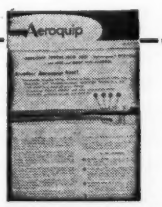

Aeroquip Corporation, Jackson, Michigan
Gentlemen:
Please send me engineering bulletin AEB-16 with complete information on Aeroquip 677 Hose of Teflon and "*super gem*" Fittings.

AF-10

Name_____
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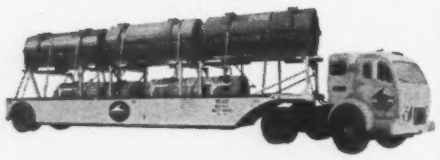

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JET BLASTS——CONTINUED

find that we had made no attempt during the past two or three years to improve ourselves mentally or physically. Perhaps we have slipped into an attitude of reticence, or perhaps we have adopted the idea that "if they don't promote us to hell with them." Common sense tells us that such reasoning is fallacious and unreasonable and we can hope to gain absolutely nothing as a result of it. If we adopt that attitude toward the Air Force because we are not promoted, and if we leave the service in search of something better (unless the one-in-a-million job turns up, and that's doubtful insofar as the average individual is concerned), we are apt to carry the same attitude to the new job. The next boss might not be so lenient if he discovers that feeling within us.

For the average individual, advancement comes faster in the Air Force and the other armed services than in any other salaried business or profession. His salary, even for a basic airman, is hard to equal on the outside when one takes into consideration the fringe benefits (we still have a few) and retirement pay. In plain words, a man could do a hell of a lot worse on a hell of a lot less.

It is time for all of us to use a little common sense and reasoning in determining why we haven't been promoted recently; why we haven't received the assignment we considered ourselves best qualified for; why we were turned down on our request for a particular overseas area. In the Air Force, as well as in the other services, a man has every opportunity to better his personal self. There is the opportunity for him to develop himself physically, mentally, and morally, and if he is sincere in his efforts he will take advantage of every opportunity which comes his way. All of us cannot be generals, but the steady application toward self improvement might be the answer some of us are searching for. At any rate, if we do not succeed in becoming generals or colonels or master sergeants simply because there isn't enough room at the top for all of us, certainly the effort we have expended will not have been in vain.

—MAJ. WENDELL F. MOSELEY

Since his graduation from Kelly Field, Tex., in 1941, Major Moseley has served in the Pacific and more recently as commander of the Air Rescue Detachment in Saudi Arabia. He is now an instructor with the Communications Techniques Branch, Division of Special Courses, Air Command and Staff College.

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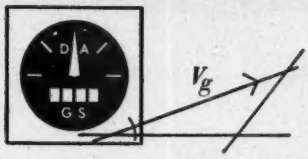

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One look and the pilot KNOWS. In a glance he reads actual ground speed and drift angle, displayed on his flight panel – automatically and continuously.

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RADAN is the result of GPL's harnessing of Doppler for air navigation—an achievement comparable in magnitude to the breaking of the sound barrier.

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The wraps are off RADAN! The civilian counterpart of GPL's famous military Doppler auto-navigators, is ready and available *now* – for anyone and everyone!

RADAN Systems have behind them millions of miles of experience in transcontinental, oceanic and polar flights . . . save precious time and fuel . . . provide a priceless margin of safety.

- **RADAN** – accurate: within 1% for ground speed, within ½° for drift angle
- **RADAN** – small: 4.4 cu. ft.—light: 89 lbs.
- **RADAN** – operates without ground or celestial aids
- **RADAN** – virtually maintenance-free

Now in quantity production, RADAN Systems are manufactured by GPL, who developed and is the nation's leading producer of Doppler air navigation systems. Address inquiries to: General Precision Laboratory Incorporated, Pleasantville, New York.

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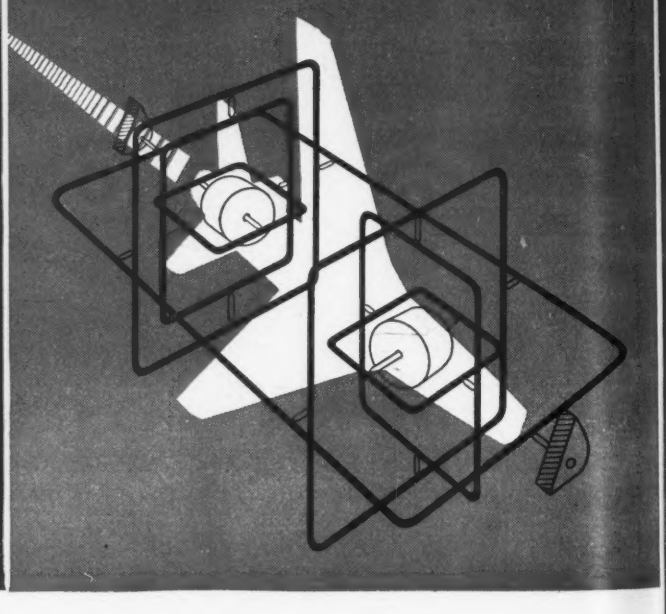

Revolutionary design...and accuracy to ¼° per hour

In a fully maneuverable twin gyro platform utilizing completely new gyro design principles, Sperry has achieved unprecedented accuracies in heading information and all-attitude flight. The first of these new Sperry systems will soon be delivered to the Air Force's Wright Air Development Center.

This Sperry system provides azimuth drift rate as low as 1/4° per hour, and in the vertical axis, 1/10° per minute. The use of twin directional gyros and new design technique permits this extreme accuracy as it minimizes the disturbance torques inherent in conventional gyros. The low drift in the vertical axis minimizes turning error—permits freedom from erection control for longer periods of time.

Coupled with doppler radar navigators, the CEP (Circular Error Probable) is materially reduced due to exceedingly low drift inertial heading feature. The inertial heading output permits either Great Circle or Rhumb Line flight paths.

The compactness of the twin gyro system makes it extremely reliable and easy to maintain. No warm-up period is required due to the balanced thermal construction and the absence of fluids.

The twin gyro platform has been designed to provide control information for complete and full maneuverability of high-performance aircraft without limit. Its full stabilization in all attitudes makes it especially adaptable for Low Altitude Bombing Systems, fighter maneuvers and missile applications.

Write our Aeronautical Equipment Division for further information.

FEATURES

Low Random Drift
Inertial Heading
Great Circle or Rhumb Line Output
No Gimbal Error
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Compact
Rugged
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Platform.....18 lbs.
Servo Amplifiers and Heading Computer }.....8 lbs.

AERONAUTICAL EQUIPMENT DIVISION

SPERRY GYROSCOPE COMPANY
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wing tips

By Wilfred Owen

The scheduled airlines carried their 300,000,000th passenger in 1956. It took them twenty-four years to carry the first 100,000,000, four more years for the second, and a little over two years to carry the third 100,000,000.

* * *

Cost of the biggest new jetliners will be some $6.25 million each—fifty times the cost of the DC-3 of two decades ago.

* * *

Aircraft engineers, according to the Aircraft Industries Association, are predicting that inhabited space craft will someday fly at speeds up to 80,000 mph on interplanetary trips to "nearby" planets. These jaunts will take several months to several years to complete.

* * *

Since 1947, airline fatality rates have declined eighty percent. Air travel is now five times as safe as riding in your own automobile.

* * *

Approximately 272 US-built jet transports may be expected in US airline operation by mid-1961, plus an undetermined number of foreign-made jets.

* * *

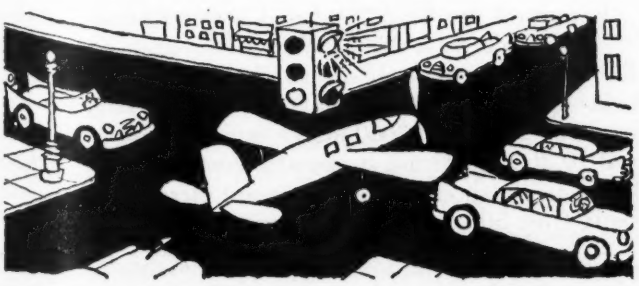
Emery Air Freight Corporation is the nation's top air freight forwarder. Last year it delivered 18,000 tons of freight to the scheduled airlines and paid air carriers $4 million.

* * *

Four out of five transatlantic air travelers leave from New York. About twenty-five percent of Americans flying to European countries are on business and thirty percent are visiting friends or relatives. Others go to study, to join their husbands abroad, and for other personal reasons. Less than one out of three goes as a sightseer.

* * *

Three businessmen escaped injury when their plane ran out of runway and rolled across US Route 1 near Wash-



ington, D.C., during the rush hour. Fortunately, a red light was holding back the stream of traffic as the plane crossed the busy highway.

* * *

A single-engine lightplane has made the round trip from the US mainland to Honolulu for the first time. Peter Gluckmann, the "flying watchman" of San Francisco, made the 2,400 miles and back in a Beechcraft Bonanza.

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The demands of today's airspeeds and tomorrow's aeronautical projects dictate the use of fasteners proved "right" beyond the shadow of a doubt.

HUCK fasteners are standard specification on most of today's aircraft. Huck's competent research engineers are at this moment, years ahead on fastener development for use when still greater speeds and more fantastic vibration and thermal tortures create the need.

There is a HUCK aircraft fastener to meet most aircraft construction needs. Special fasteners will be developed to dependably fill unusual applications.

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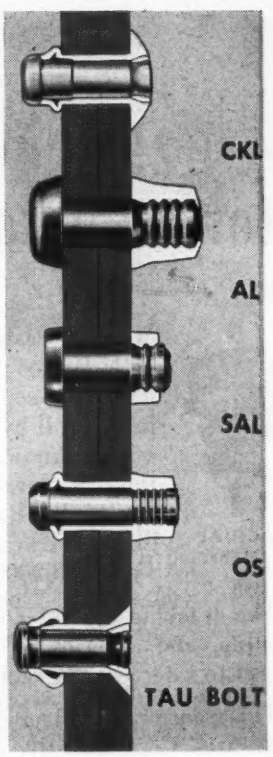

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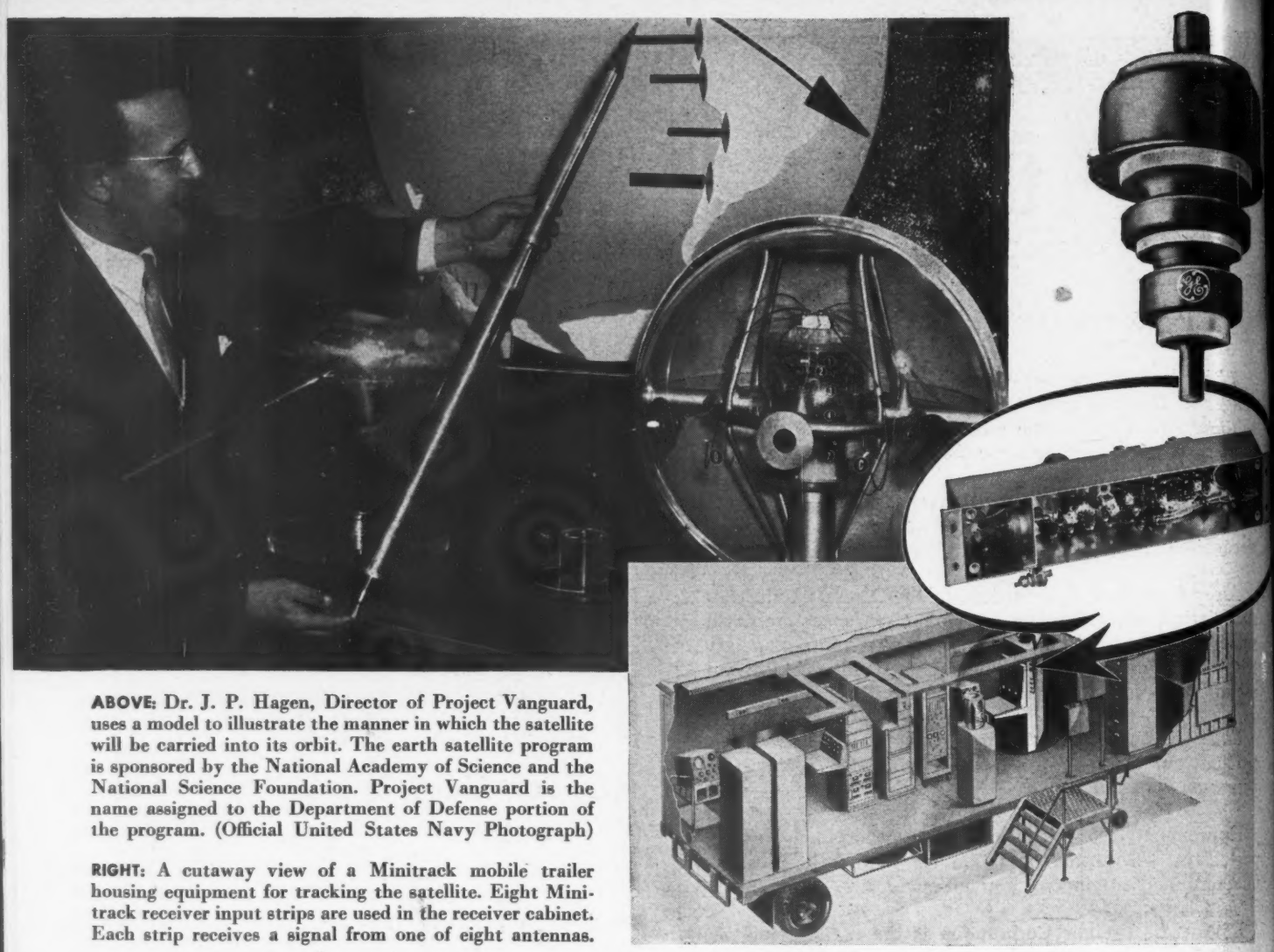
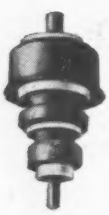


ABOVE: Dr. J. P. Hagen, Director of Project Vanguard, uses a model to illustrate the manner in which the satellite will be carried into its orbit. The earth satellite program is sponsored by the National Academy of Science and the National Science Foundation. Project Vanguard is the name assigned to the Department of Defense portion of the program. (Official United States Navy Photograph)

RIGHT: A cutaway view of a Minitrack mobile trailer housing equipment for tracking the satellite. Eight Minitrack receiver input strips are used in the receiver cabinet. Each strip receives a signal from one of eight antennas.

GL-6299 low-noise G-E triode is designer's choice for Minitrack System of tracking Earth Satellite



ACTUAL SIZE

When the satellite is launched in 1958 as part of a United States program for the International Geophysical Year, it will be followed in its orbit by a unique tracking system. This system, known as Minitrack, was designed by the U.S. Naval Research Laboratory and built by Bendix Radio Division, Bendix Aviation Corp. The system uses General Electric tube Type GL-6299 in a major role.

The tracking system consists of a transmitter in the satellite, and a series of receiving stations strategically placed to intercept the radio signals.

This transmitter will have an output power of as low as 10 milliwatts. Consequently, a circuit had to be designed to provide low-noise amplification of the signals. The low-noise G-E GL-6299 was picked for the R-F stage in this circuit because of its ability to provide sufficient power gain to prevent any significant contribution by the mixer stage to the over-all receiver output noise.

The designers of the Minitrack System took advantage of the tube's exceptionally low noise figure of only 2.5 db at 108 mc. Additional advantages realized were receiver input strips with greater inherent stability, freedom from neutralizing requirements, and ease of alignment procedure.

Ratings of the GL-6299, based on performance results of the triode as a Class A_1 grounded-grid, coaxial-type RF amplifier with a 10-megacycle bandwidth include: a noise figure of 4 to 5 db at 400 mc.; 8 db at 1200 mc.; and less than 13.5 db at 3000 mc.; a gain of 17 db at 1200 mc. and 10 db at 3000 mc. Successful completion of extended life tests is responsible for the recent increase in tube warranty from 500 to 1000 hours, with no increase in price.

For detailed literature or application assistance, contact your regional power tube representative, or write to *Power Tube Department, General Electric Co., Schenectady, N. Y.*

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first . . . *plane to land at the South Pole*

place . . . *Operation Deepfreeze II*

heater . . . *Herman Nelson, of course*

The first aircraft ever to land at the South Pole—and the first Americans to set foot at the South Pole . . . these were history-making feats achieved by Operation Deepfreeze II. The mission was carried out on October 31, 1956, by a party and crew of seven men in this Navy R4D. Naturally, Herman Nelson Portable Heaters were chosen as support equipment for this important mission, providing quick, unfailing heat. Herman Nelson's 16 years of experience in the portable heating and ventilating field can be put to work on your problem.

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WITH THE EDITORS OF AIR FORCE MAGAZINE

The first **fully accredited residence college** on a military installation in the US has been established at Mitchel AFB, N.Y. Called **Mitchel College of Long Island University,** the new institution will offer baccalaurate and associate degrees and will have divisions in the humanities, the sciences, social sciences, and business administration. The college, a branch of Long Island University, is open to members of the armed forces on active duty, their dependents, civilian employees of the Department of the Air Force, active participants in the Air Force Reserve program, and veterans eligible for GI Bill benefits.

* * *

Before he was sworn in to office last month, there was considerable speculation on possible nicknames for the new Secretary of Defense, Neil H. McElroy. His career in the soap business naturally had led to suggestions somewhat lacking in dignity. But the mystery was solved when it was learned that his son's name for dad is "Wheely," for "Neil the Wheel." Son Malcolm is in return called "Hotshot."

* * *

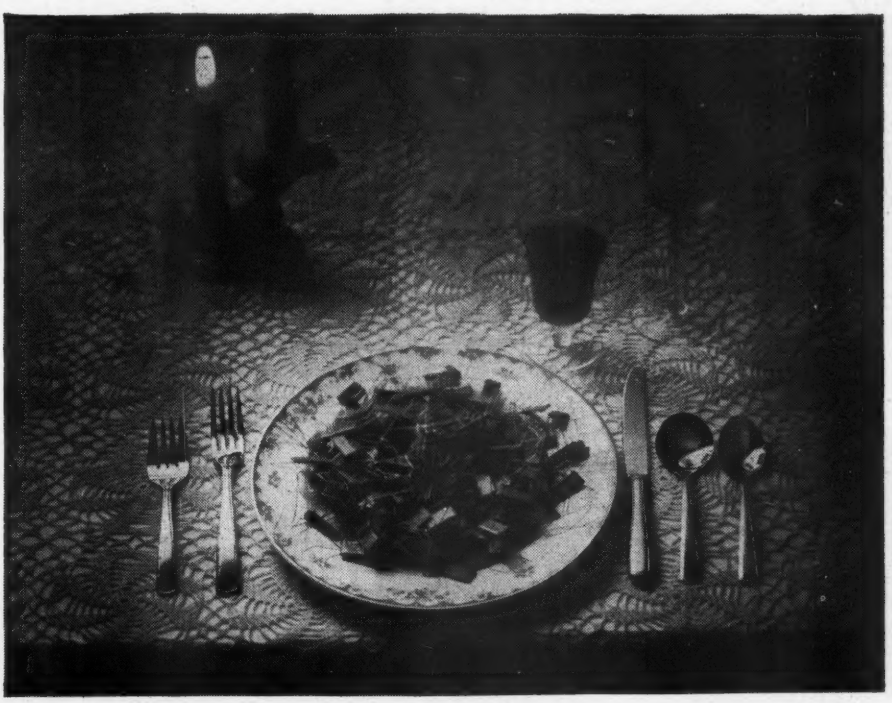
Possibly one of the most telling comments in the press on the much-heralded success of the Soviet earth satellite was in a London *Daily Telegraph* editorial which pointed out that the Russian system, which has **so long proclaimed its dedication to the advancement of the working class** really had done nothing more than reach outer space **without ever having enjoyed the pleasures of this earth.** For a system supposedly dedicated to bettering conditions on *terra firma,* shooting off into space, the *Telegraph* said, was a "**spectacular irrelevance.**"

* * *

AF scientists at Holloman AFB, N. Mex., have created **artificial starlight** ten times as bright as that given off by the planet Venus. Accomplished chemically, the fantastic light was created by **launching of sodium** in a cylinder device suspended from a balloon. At 88,000 feet, the sodium was released by a timer into the ozone layer of the atmosphere, causing a spectacular glow.—END

Insatiable scientific appetites

Not too long ago we were asked to produce a ceramic capacitor with a temperature coefficient of capacitance of 2 parts per million per °C — in effect a new tolerance standard of .0002%.
The short of it is that we produced such a capacitor and it is probably the most stable unit of its kind known to science today.
The long of it is that when no commercial equipment was available to test the precise characteristics of the finished capacitor, we developed an incremental capacitance ratio bridge to prove that we had achieved this new standard. And in the process we developed a materials blending method that enables components to be pre-tested before they are produced.
We enjoy tackling problems like these . . . where the desired results may not be enough to satisfy our scientific appetites . . . where we can give our customers much more than they even hope for. And we usually do.



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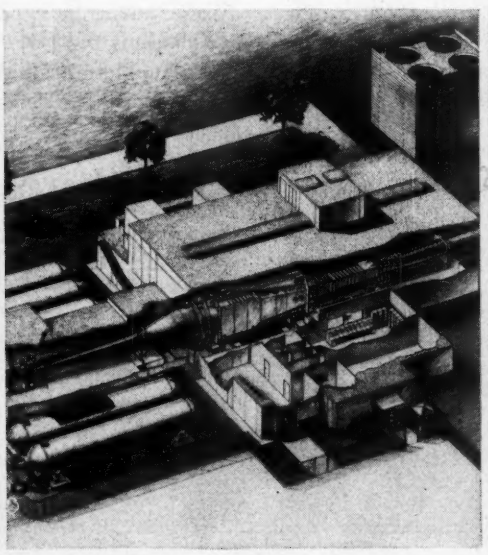
FACILITIES—Chance Vought occupies 2½ million square feet of modern plant facilities situated in Dallas, Texas. Close to a large pool of skilled manpower, and with ample manufacturing space, Vought is able to handle quantity production with maximum quality control. Tools and equipment are modern and of sufficient scope to handle the toughest jobs in a complex missile age.



RESEARCH—R & D progress has always been of prime importance to Vought. Both in piloted aircraft and missile systems, research and development people at Vought have access to the finest equipment and facilities in the world—including the only low-speed wind tunnel in the Southwest and a now-building Mach 5 wind tunnel for advanced design research in hypersonic aircraft and missiles.

ENGINEERING—Traditionally strong in this vital area, Vought today has the capable mindpower to set the pace to tomorrow. In such important missile engineering areas as electronics, propulsion, guidance controls and aerodynamics, Vought engineering teams have the experience to give systems development full integration for the improvement of the final product.

The missile age belongs to those who can deliver the goods. Chance Vought *has* delivered...for through the highly successful *Regulus I* and the bold new *Regulus II* projects, U. S. Missile Power has gained two workable "birds", both capable of reliable high performance under a wide variety of conditions.

The experience gained by Vought missile engineers on the *Regulus I* project covers the entire weapons system development. From the missile itself, to training aids, operational techniques and logistics, Vought-perfected procedures condition the missile for life in its military environment. The same complete systems integration is now in work on *Regulus II*.

Today, there is no other company that has such a backlog of working knowledge in complete surface-to-surface missile systems development. This practical experience won by Vought engineers is a realistic expression of a capability that turns R & D knowledge into useful "hardware". Who will build tomorrow's missiles? The dynamic successes of many years of missile experience tell you that one of tomorrow's builders will be Chance Vought.

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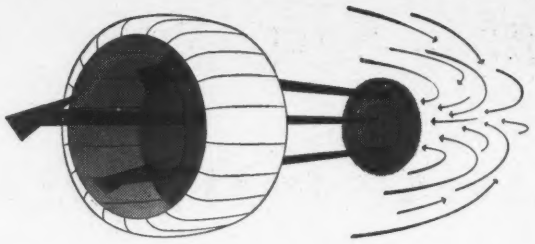
CAPABILITY



With us, capability is the sum total of many factors: an applied combination of our modern industrial installations, highly skilled manpower, and tightly knit organizational spirit!

That spirit is an intangible. It can't be measured specifically like our man or machine power – but it's that asset that helps spearhead our –

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What's New With ★ RED AIRPOWER

Here's a summary of the latest available information on Soviet air intelligence. Because of the nature of this material, we are not able to disclose our sources, nor document the information beyond the fact that the sources are trustworthy.

Three Soviet installations for atomic-nuclear research have been identified for AIR FORCE Magazine. One of these, in the Caucasus region, is at Mineralnye Vody, a small city in the mountain fastness between the Caspian and Black Seas. This was one of the original sites for work on atomic weapons, and has nearby uranium deposits.

People who enter the plant area are thoroughly searched going in and coming out. Like most Soviet manufacturing and mining installations, it is hidden behind a high wall.

Another community which has become atomically important since the war is Ust Kamenogorsk. Not far from this small community to the north of India is the shot site for the first Russian atomic explosion. It is also in a very mountainous region.

One major explosion touched off here that caused many seismographs to be affected throughout the world was explained by the Soviets as an atomic explosion to blast through an entire mountain range. The Russians indicate they are building a canal through the range to tie the Ob River network into other water communications channels farther west.

The third important center is Podkamennaya Tunguska, a small village in the north-central vastness of Siberia. It was near here that the Soviets exploded their first hydrogen bomb, after calculations revealed that it might not be wise to touch it off near Ust Kamenogorsk because of proximity to India.

At the Podkamennaya Tunguska test site, some distance from that small community, there is a sizable lake with an island in the middle. The hydrogen weapon was exploded on the island, which reportedly was completely denuded of life as a result.

* * *

The USSR Ministry of Aircraft Production has delivered three TU-104s to Czechoslovakia. The Czechs will operate the aircraft between Moscow and Prague on a route duplicating that presently flown by the Soviets. Other possible jet transport routes that the Czechs might fly have not been indicated as yet. However, three more TU-104s are on order.

* * *

Another satellite airline is sprucing up with new Russian equipment. The national Bulgarian airline, called TABSO, has ordered an unknown number of AN-10 turboprop transports. These are better known as Ukrainas, and were designed by O. K. Antonov.

* * *

Meanwhile, Bulgaria is developing its own helicopters. The first test flight of the LAZ-10H has been made. It is a lightweight, two-place machine, with a two-blade rotor. The blades are driven by pulsejets.

* * *

Poland has set the price on its version of the Russian MIL-1 helicopter. It is being offered for sale by Motoimport in Warsaw for a price equivalent to about $55,000. The Poles recently displayed the helicopter at the Paris air show.

* * *

There is some indication that the Russians have not yet gone into production on the AN-8 transport, which they first showed on Soviet Aviation Day in June 1956. Powered by two turboprops, the airplane was designed as a military assault transport. However, it was followed within a year by an AN-10 transport (*see page 84*), said to be designed for passenger service. Now it is believed the latter has been so much more successful as a transport that it will be adapted to military use as well, and the AN-8 will be abandoned.

With their extensive operations in the north, along the Arctic coast, the Russians need a transport of this type. They will be able to use the AN-10, thanks to its load-dispersing wheel construction, and relatively short takeoff requirement, on the same fields where they have been operating IL-12s and IL-14s. Relatively little airport improvement work will be necessary to make airports in the north adaptable to the AN-10 and its greater load-carrying capability.

* * *

A survey of Russian machine tools on display at the gigantic Agricultural and Industrial Exhibition in Moscow shows many general types, and only a few that could be called specialized. Some seventy-five different machine tools are on exhibit and if those that are displayed can be considered representative, it would indicate that reports of relatively fewer specialized machine tools in Soviet industry are confirmed. In Russia, the Ministry of Aircraft Production has one of the highest priorities for machine tools.

* * *

In East Germany, the Office of Technics, which directs industry concerned with military production, has been divided into three sections more or less paralleling the three services: army, navy, and air force. Administration I is for the production of arms and equipment. Administration II is for the manufacture of vehicles and shipbuilding. Administration III is for aircraft and other orders of the East German Air Force.

* * *

A new transport of Polish design, begun originally as a twin-engine airplane, is being reworked into a four-engine type in an effort to secure foreign sales. The Poles are recognizing that the market for four-engine types is better than for twin-engine transports. The medium-range transport will be powered by four piston engines, will be offered at a relatively low price, and will be put into operational use by LOT, the Polish airline, before it is offered elsewhere.—END

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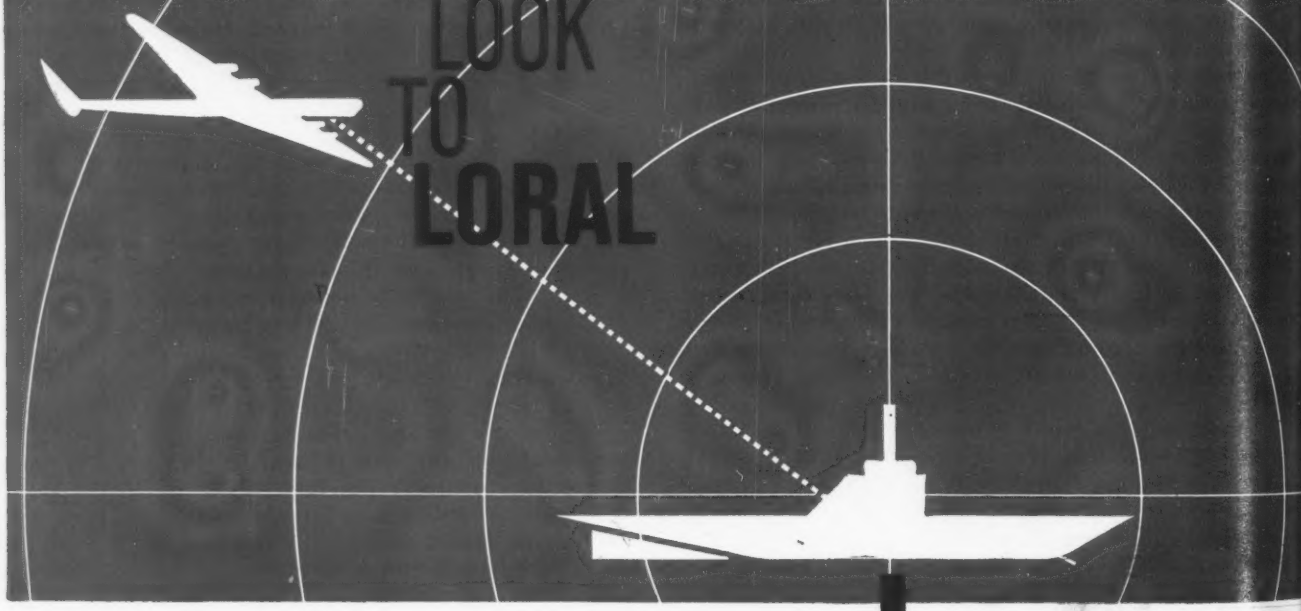

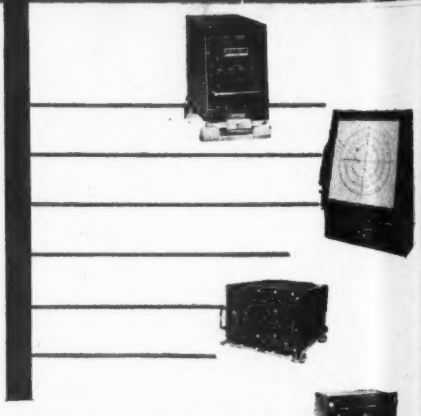

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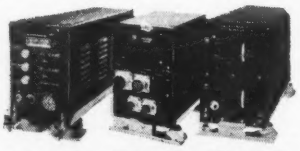

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AFA Launches Airpower Book Club

With this announcement, the Airpower Book Club, sponsored and managed by the Air Force Association, is officially launched. The annual subscription is $15.00, if paid in full upon joining, or $18.00 if spread over three payments of $6.00 each. In return, the Book Club member will receive four books, with a guaranteed minimum retail value of $25.00, plus a handsome premium book upon joining. In addition, Book Club members will receive a quarterly publication, to be called "Airman's Bookshelf," which will contain a comprehensive review of the current selection, plus reviews of selected titles of interest in airpower and related fields. All of these additional books may be purchased, through the Airpower Book Club, at a ten percent discount to Book Club members only.

The initial premium book, given free to Book Club members upon joining, will be *A History of the United States Air Force*. This is the hard-back version of the history which appeared in the Golden Anniversary issue of AIR FORCE Magazine, August 1957, with additional material, including a comprehensive index, bibliography, and a foreword by Gen. Thomas D. White, Chief of Staff, United States Air Force. The book is being published commercially by D. Van Nostrand Co., Inc., Princeton, N. J., and will retail in the bookstores for $6.75. In his foreword to the history, General White says:

"I commend this volume to all who have a deep and abiding interest in American airpower—to those of us who wear the Air Force uniform, to our brothers-in-arms of the Reserve components, to those who support Air Force activities in other capacities. It is a proud chronicle of the past and a valuable tool for the future."

The initial selection of the Airpower Book Club will be a definitive biography of Billy Mitchell. Entitled *Mitchell: Pioneer of Air Power,* it is by Isaac Don Levine. The Mitchell book was first published in 1943 but has been long out of print. It is widely acknowledged to be the finest biography of Mitchell ever done and has been updated with new material. Selection of the Mitchell book represents one of the aims of the Airpower Book Club, namely to make available again selected airpower classics of the past. *Mitchell: Pioneer of Air Power* is published by Duell, Sloan & Pearce, Inc., New York, N. Y., and will retail in the bookstores for $6.00.

Of the Mitchell book, Lt. Gen. Dean C. Strother, Commander, Air University, says:

"This is the classic biography of Mitchell, the only one based on his papers. More than a dramatic story of one of America's most outstanding airpower champions, it should be read by every serious student of national security in this air-atomic age."

Thus, another aim of the Book Club will be accomplished first crack out of the box—to bring the best in airpower literature to Club members at the lowest possible prices. Immediately upon joining, the member will get for his $15.00 two books with a combined retail value of $12.75, with the certainty of getting the three best airpower books to be published during the balance of the year for only $2.25, or $.75 apiece. The saving is made possible primarily by the unique approach of selecting only four books annually and offering them to Book Club members without alternate choices or rejections.

It is the only Book Club we know of with an annual price tag known in advance and hence makes an ideal gift. We will have more to say about it in future issues of AIR FORCE Magazine. Right now, we hope you take advantage of the coupon at the bottom of this page, for yourself and for your Christmas shopping.—The Editors.

(See page 27 for book reviews)

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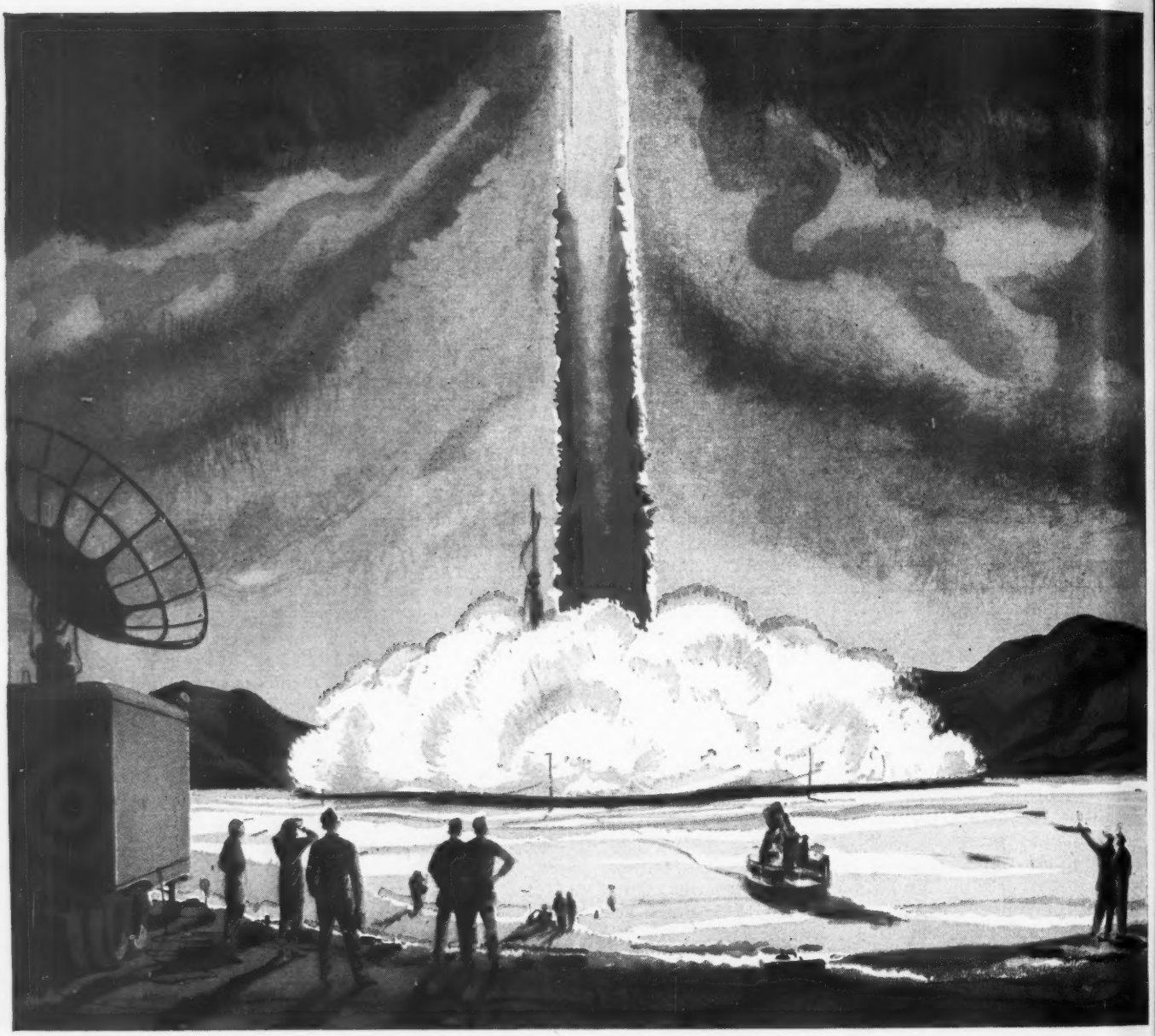

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Air Force flyers seldom achieve note for "spit and polish" soldiery. But when the chips are down, when there is a job to be done, whatever it is, they have no peers. Much of the Air Force tradition is made up of individual acts of heroism, skill, ingenuity, and determined human endurance.

High in this category is the chronicle of Capt. Thomas Pittman, SAC B-47 pilot-navigator-bombardier who lived through a harrowing ordeal in the frozen wastes of north Canada because he refused to die, because he simply would not give up. Nationally known Rutherford Montgomery is the author of *Tom Pittman, USAF* (Duell, Sloan and Pearce, $3.00).

Pittman was thrown from his exploding B-47 high over Saskatchewan during a routine combat training flight. He landed in the sub-zero wilderness with one leg torn and broken in several places. Shrouded in his parachute he lay immobile, under five feet of snow, for seventy-nine hours without food or water.

Yet he survived and today he again flies a B-47 for SAC—the only amputee in AF history to achieve this feat. His battle to return to flying status, much less stay in the service (AF Regs normally do not permit amputees to remain on active duty) is a magnificent demonstration of determined will, refusal to accept defeat, and dedication to a combat flying career.

* * *

Airmen will enjoy reliving with author-pilot Frank Kingston Smith the anguish and anxieties, the thrills and joys of the first hours of flight described in his *Week-end Pilot* (Random House, $3.75). The book is Smith's personal story of how he bought an airplane (Cessna 140), hired an instructor, learned to fly, and now cavorts around the country on week ends and holidays pursuing what he calls mankind's most exhilarating and rewarding hobby, one that more people ought to try.

The author, a thirty-five-year-old lawyer, tells in his narrative how he got his wings, a grip on himself, and a new lease on a hectic business life that had been marred by ill health. Straightforward and good-natured, the book is spiced with humorous incidents like the time the author landed in an unmarked "pea patch" and found himself avidly welcomed by a delegation of nudists.

Through his own experiences he unfolds the intricacies of flight techniques, aerodynamic theory, radio and dead-reckoning navigation, inflight maneuvers, cross-country planning, weather problems, airport approaches, landings and taxiing procedures, and dozens of techniques with which the private pilot must become thoroughly familiar. In terms of his own finances, he discusses the feasibility of owning and operating his own private airplane.

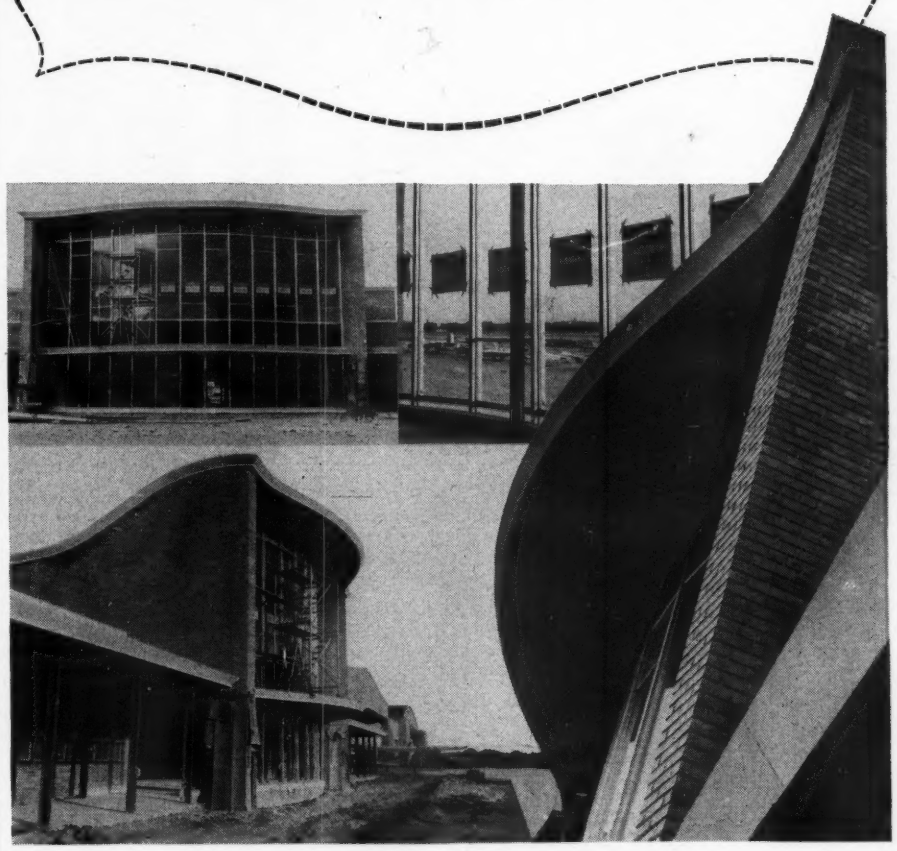
The book is a veritable gold mine of information for the student and inexperienced private pilot, a humorous, nostalgic dip into the past for the veteran flyer, and an effective siren voice for those who are tempted by flying.

Former AF pilot and RAF Battle of Britain veteran William Lichtman has written a first novel based on his experiences as an American volunteer pilot in Israel in the Israeli-Arab War of 1948.

Between the Star and the Cross (Citadel, $3.50), like most fictionalized autobiographies, is a "chest unloader," and idealist Lichtman pulls no punches in exposing the strange assortment of bedfellows involved in the

(Continued on page 30)

that have
The Wonderful Shape of Things ~~to~~ Come!



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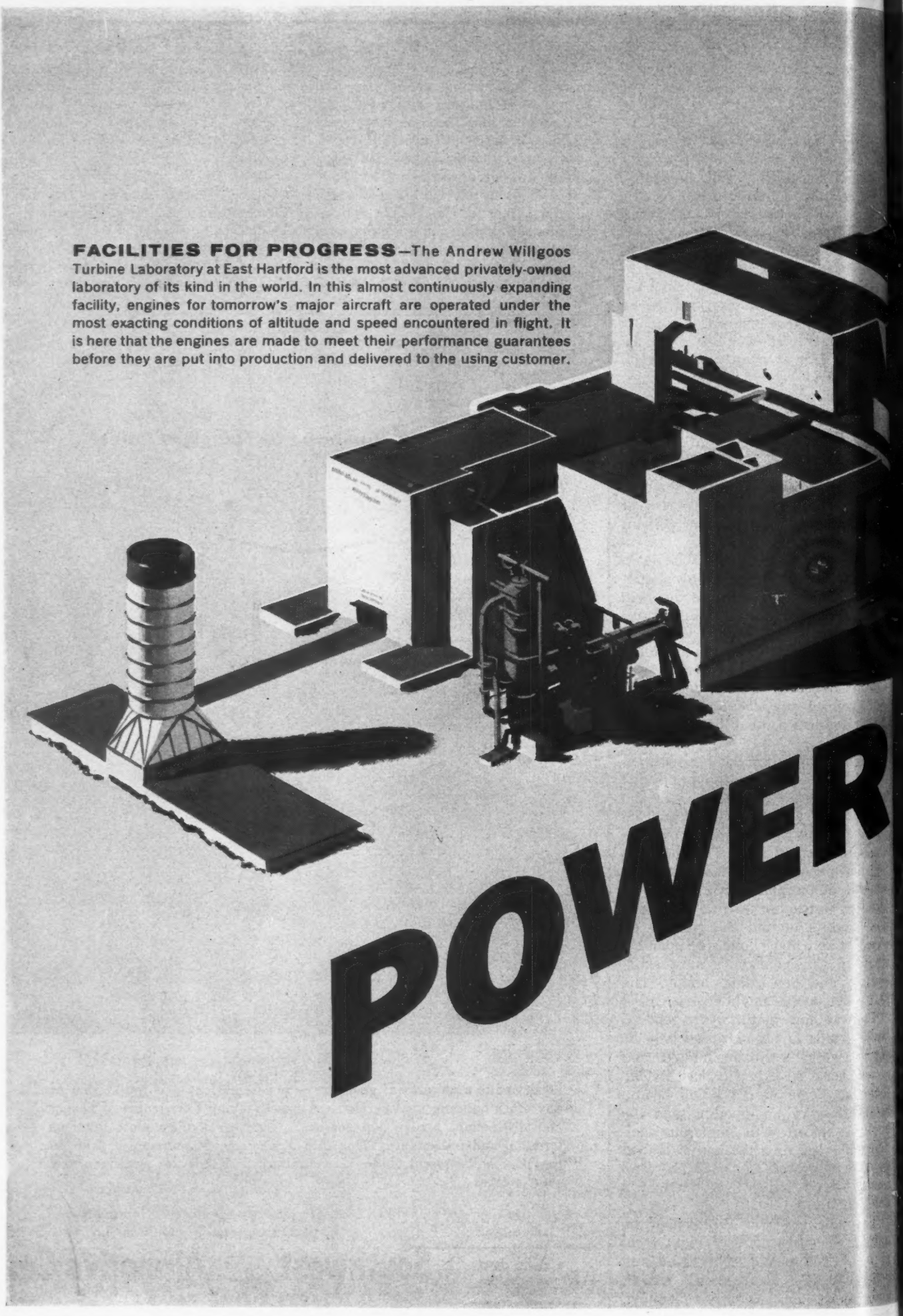

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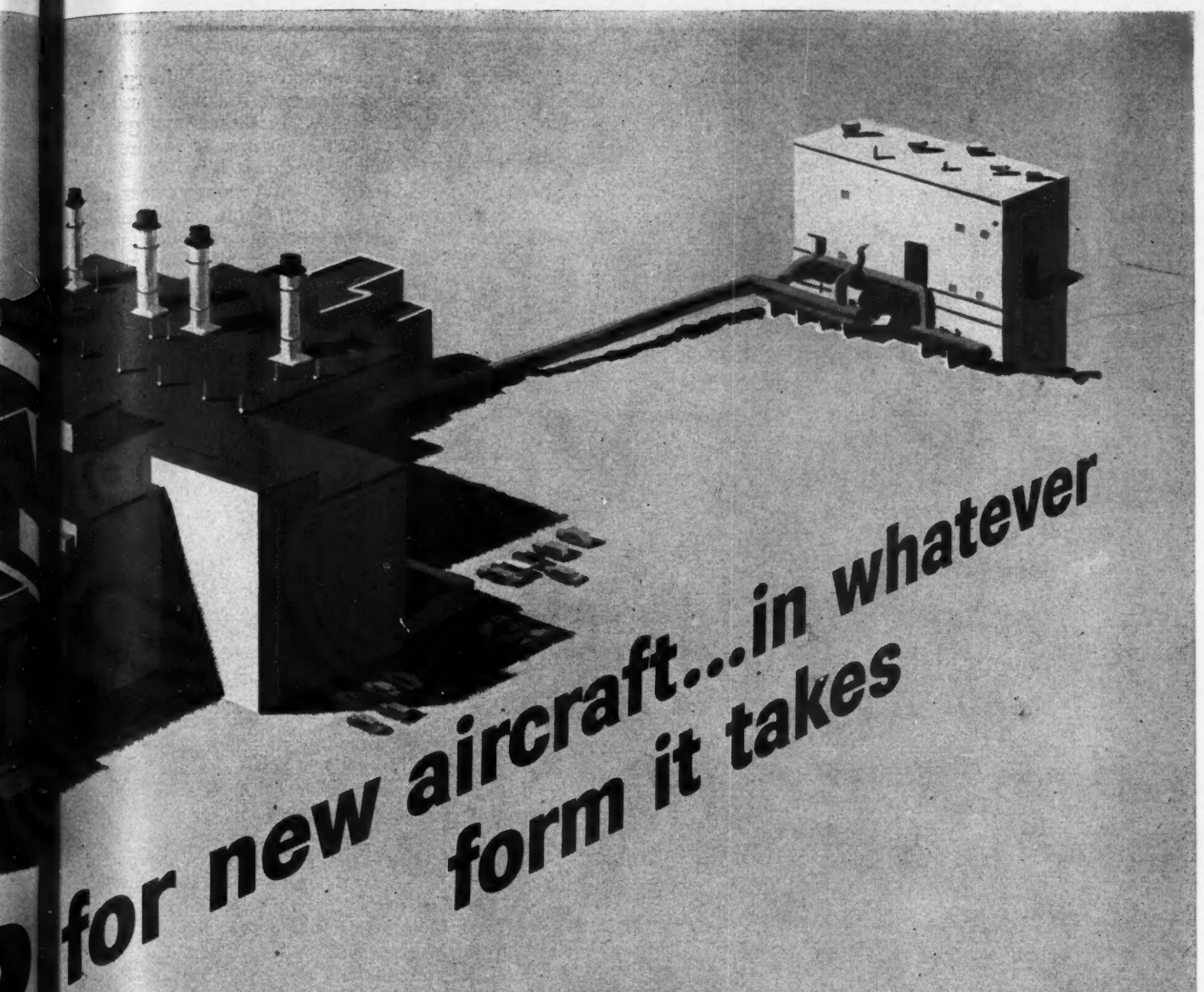

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Behind these windowless walls in central Connecticut a new generation of aircraft engines is being put through its paces.

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In whatever future form aircraft power may take . . . in a new family of engines, new fuels or materials, or new systems of propulsion, Pratt & Whitney Aircraft will continue its leadership in aircraft engine design and production.

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crusade to reestablish the ancient land of David.

The book is written with realism and detail but marring its excellence is an overdose of editorializing and moralizing. The cross of centuries of persecution still weighs heavily and with Lichtman it seems, at times, to be an obsession.

Between the Star and the Cross is not a great novel by any stretch, but it is a story of adventure about an American-Israeli air hero, based on fact, and packed with interesting background on one of the world's hot spots today. For a first effort, Lichtman hits above average.

* * *

Heading a list of new air books for the younger set is Charles Coombs' *Rockets, Missiles and Moons* (William Morrow, $3.75). Third in Coombs' current series on modern aeronautica (*Skyrocketing Into the Unknown*, 1954, and *Survival in the Sky*, 1956), it is a thorough, accurate, and simplified presentation of the history, design, construction, test flight, and future prospects of rockets and guided and ballistic missiles. It features all the current and past types developed and tested by the various services, and speculates on the role of the missile in man's forthcoming conquest of space. For background, the author visited all the research, development, and test centers of the Army, Navy, and Air Force and he has produced a highly informative volume from interviews with military and civilian scientists. Copiously illustrated and printed in large type for easy reading, it is especially valuable as a basic primer for the teen-ager and young adult, although like his other books, it should interest readers of all ages.

In a closely related field is *The Complete Book of Jets and Rockets*, by D. N. Ahnstrom (World Publishing Company, $4.95). Mainly a general illustrated history and discussion of jet propulsion and jet aircraft, it includes a brief rundown on all of the early military missiles like Nike, Navaho, Honest John, Redstone, Regulus, and Matador. Emphasis is placed on military and civilian jet aircraft and the problems of jet flight, with a chapter on how to become a jet pilot.

* * *

Reporter John J. Floherty, author of some 200-odd books about professions for the young adult, has revised his 1950 *Aviation From the Ground Up* (J. B. Lippincott, $3.00), bringing it up to date with the latest aeronautical developments. This one deals in the main with those segments of aviation which might attract the young lad toward an air career. Tracing a very general history of flight, as he saw it develop, he covers such topics as aircraft and crews, airline flying, the helicopter, jet aircraft, military flying. A chapter on the education needed for a career in aviation's many fields gives some interesting but not very specific or useful advice.

* * *

Strictly for the younger set, ages ten to fourteen, is an informative illustrated account of what goes on in the planning and preparation for an overseas flight. The best part of *Flight Overseas*, by Henry B. Lent (Macmillan, $3.00) is the hour-by-hour report of the flight of a transoceanic luxury clipper—what each member of the crew does, and how they work as a team. It is bound to tickle the imagination of a youngster.

* * *

Recent American publication of a small British original adds to the

(Continued on page 33)

Guided missiles of the future are *on our scopes today*—thanks to the agile brain of an amazing new ECM Simulator developed for the Air Force by Hallicrafters RDA.*

Designed for advanced study of jamming, deception and countermeasures techniques, the device furnishes to the PPI scope exact simulations of moving targets, and jamming, *in infinite variation.*

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The control station is portable and can be operated from the ground or in air to air operations. Mission equipment such as cameras, weapons, target markers and detonators can be actuated at the control station.

Kaman is proud of this forward step which has been taken in behalf of our National Defense effort.

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growing list of aviation dictionaries. *An A. B. C. of Aeronautics,* by L. L. Beckford (Pitman, $3.95) aims strictly at the layman reader of current aviation writing. The alphabetical listing and definitions of air terms is limited to the technical language of flight most commonly used by air writers today but which is largely unfamiliar to the man on the street. Some of the terminology is peculiar to the British press, and is rarely found in American writing.

* * *

Every once in a while, one strictly for the little lady comes across the desk. The third such this year is *The Answer Book on Air Force Social Customs,* by Esther Wier and Dorothy Coffin Hickey (Military Service Publishing Company, $3). The authors, service wives themselves, divide their work into four chapters: social calls; social occasions (twenty-two of them from breakfasts to formal dinners, house guests and organized parties); overseas duty; and miscellaneous Air Force customs. It winds up with a section on insignia, Air Force terminology, and a brief bibliography. It is a practical reference and how-to-do-it manual that AF wives will find extremely handy.—JAMES F. SUNDERMAN

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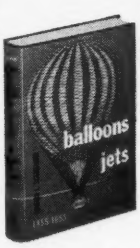
FACTUAL as a blueprint!

BALLOONS TO *JETS*



by HOWARD L. SCAMEHORN

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You share the awe of country fair crowds as intrepid aeronauts of the 1850's risk life and limb in flimsy bags of air. Here are the crates and heros, the nostalgic derring-do of barnstorming days. Wright . . . Curtiss . . . Lindbergh . . . they're all on hand, with a host of obscure dreamers and doers without whom the story of aviation could not be told.

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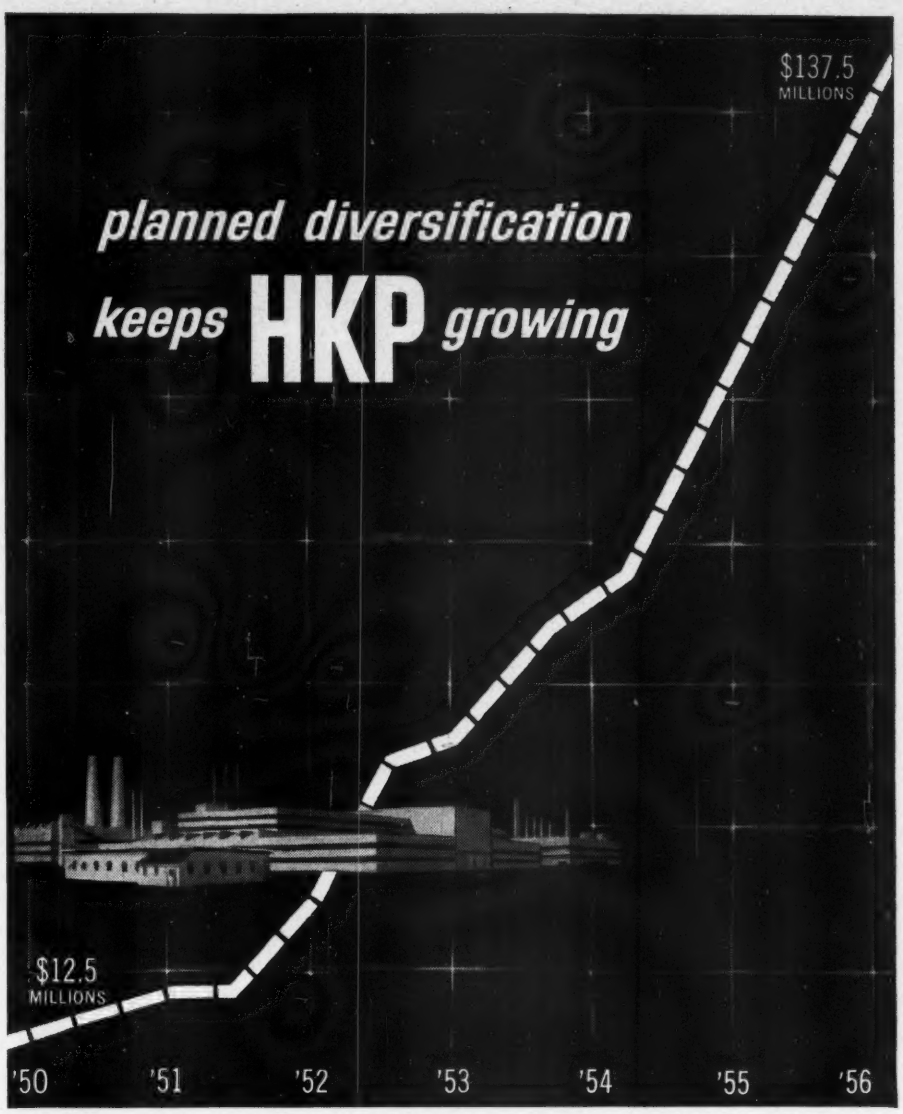

Acquisition of The Cleveland Hardware & Forging Company brings to eleven the number of versatile Porter divisions. They manufacture products in 40 plants in the United States and Canada, four of which have been acquired so far this year.

Serving industry's needs is a prime responsibility at H. K. Porter Company, Inc. Porter maintains intensive development programs which are translated into new manufacturing developments almost every month.

This awareness of the needs of the market place has resulted in a program of planned diversification...**and a 1150% increase in Porter business volume since 1950.** This volume comes from divisions manufacturing steel and fabricated steel products, copper-alloy metal products, electrical equipment, refractories and industrial rubber, wire and cable.

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Editorials

The Sputnik Pearl Harbor

By Peter J. Schenk
PRESIDENT, AIR FORCE ASSOCIATION

AS SPUTNIK I orbited the earth, each radioed beep from outer space announced the Pearl Harbor of the Technological War.

When war in technological terms was introduced to our readers six years ago (AIR FORCE, *November 1951*) there were few to listen and believe. But, as reaction to Sputnik continues to spill over the front pages, there is evidence of a break-through against the destructive complacency which has long drugged this nation.

There is solace in this new awareness, but we can only hope that constructive reaction has not come too late.

How soon the men who launched Sputnik I in pursuit of knowledge will be ready to launch ICBMs in pursuit of world domination, one can only guess (along with our intelligence agencies).

But that these men are prepared to do so, if it suits their master plan, is beyond speculation. For surely the Soviet leaders who directed the killing of thousands of unarmed Hungarians would not hesitate to kill millions of Americans, equally unarmed in World War III terms.

Actually, we should be grateful that the modern Pearl Harbor has come in the form of a man-made moon, and that Russia has not introduced us to space flight with thermonuclear warheads.

Against such a grim background, the nation feels a desperate need for strong and enlightened leadership.

The first great opportunity for such leadership came the morning of October 9, a few days after the advent of Sputnik I, when Washington news correspondents crowded the White House press chamber.

Sputnik I signaled the need for a dynamic change in both the course and tempo of national policy. It gave the President an unequaled opportunity to shrug off political pressures and come to grips with the full meaning of Technological War. History was waiting to be made in the President's press conference of October 9.

What might he have said at that time? The New York *Herald Tribune*, in a searching editorial which appeared the same day, summed it up in this manner:

"If we learn the lesson that Sputnik has to teach us, here is what America, under the kind of leadership it is entitled to expect, will do:

"Launch a huge national program of basic research and development. . . .

"Break down the senseless walls of super-secrecy which are keeping nothing from the Soviets, but preventing our own scientists from cross-fertilizing each others ideas. . . .

"End the disgraceful interservice bickering over scientific development. . . .

"Tackle the whole national educational crisis in a way a mighty and responsible nation ought to tackle it. . . ."

Certainly nothing short of such heroic measures could meet the challenge of the hour. But our leadership was not equal to the crisis. As the Republican *Herald Tribune* commented sorrowfully the following day:

"What the nation expected yesterday from the President of the United States was leadership. It did not get it."

Instead, the nation received excuses and evasive maneuvers; a weak attempt to minimize, if not confuse, the true significance of the Soviet achievement.

Thus, the first "battle" following the Sputnik Pearl Harbor ended in a defeat for the American people.

Knowing how easy it is to criticize from the sidelines, one is reluctant to place the blame squarely in the lap of the President. Yet, there is no other choice.

For several years a great group of men might logically have shared in the blame. Many men of influence, in and out of government, including leaders of science, had failed to grasp what Dr. Edward Teller told an Air Force Association conference last February.

"Within ten years" he said, "the Soviets will have the best scientists in the world. I am not saying this will happen unless we do this or that. I am simply saying it is going to happen. The time now has come to talk about the United States *recapturing* the world lead in science, *not* how to keep that lead."

That conclusion, in all its ramifications, is not easy to accept. However, an increasing number of official and unofficial advisors to the White House have come to realize the appalling lack of leadership being applied to the problems of national survival.

On the other hand, the few really close advisors to the President have either failed to comprehend Russia's growing dominance in the Technological War or have chosen not to present the bad news to him.

Yet, in the last analysis, the finger must be pointed at this one man—who alone has the responsibility and power to turn the tide.

Presumably, the Commander in Chief has seriously believed that our position of dominance in the air and space above has not been in jeopardy. Even that reaction might have been understood, knowing the information pitfalls of Washington, until Sputnik I came along to open the eyes of all who would see. That is why the performance of the President at his Sputnik press conference was so depressing.

It is unfortunate that the scientists upon whom he admittedly depended for his reaction to Sputnik I, although capable men in their fields, are far removed from the technological issues at hand. This would suggest that the President merely has been inadequately advised on the scientific issues of the day. But that is far too pat an answer.

It is the President's responsibility to utilize the best scientific advice the nation has to offer. Why, then, has he permitted so few knowledgeable scientists to come before him? How could he tolerate a Secretary of Defense who couldn't understand that what man eventually discovers on the other side of the moon might drastically alter the nature of life on this planet? How could the President let the shortage of scientific brainpower be "solved" by reducing the demand for it through research budget reductions, at the very time that the Soviets were stepping up their scientific manpower programs? How could he allow the aviation industry, upon which the na-

(Continued on page 37)

ECONOMY IS A WEAPON—National defense must fit the national pocketbook. Now, more than ever before, each element must be weighed against its cost. Northrop Aircraft's budget-minded management is continuing to use technology to achieve low-cost solutions to defense problems. This program brings results in weapons like the Snark SM-62, America's first intercontinental guided missile, the Scorpion F-89 all-weather interceptor series, the Radioplane Division's low-cost target drone and missile systems, and the Anaheim Division's ground-handling equipment, missiles and ordnance products. Latest example of this forward thinking is Northrop's new supersonic T-38 jet trainer airplane, a lightweight, economical member of an entirely new family of military aircraft which reverses the trend of rising costs. The T-38 can save hundreds of millions of tax dollars, and help provide the free world with the weapons of powerful military strength and vigorous economic solvency.

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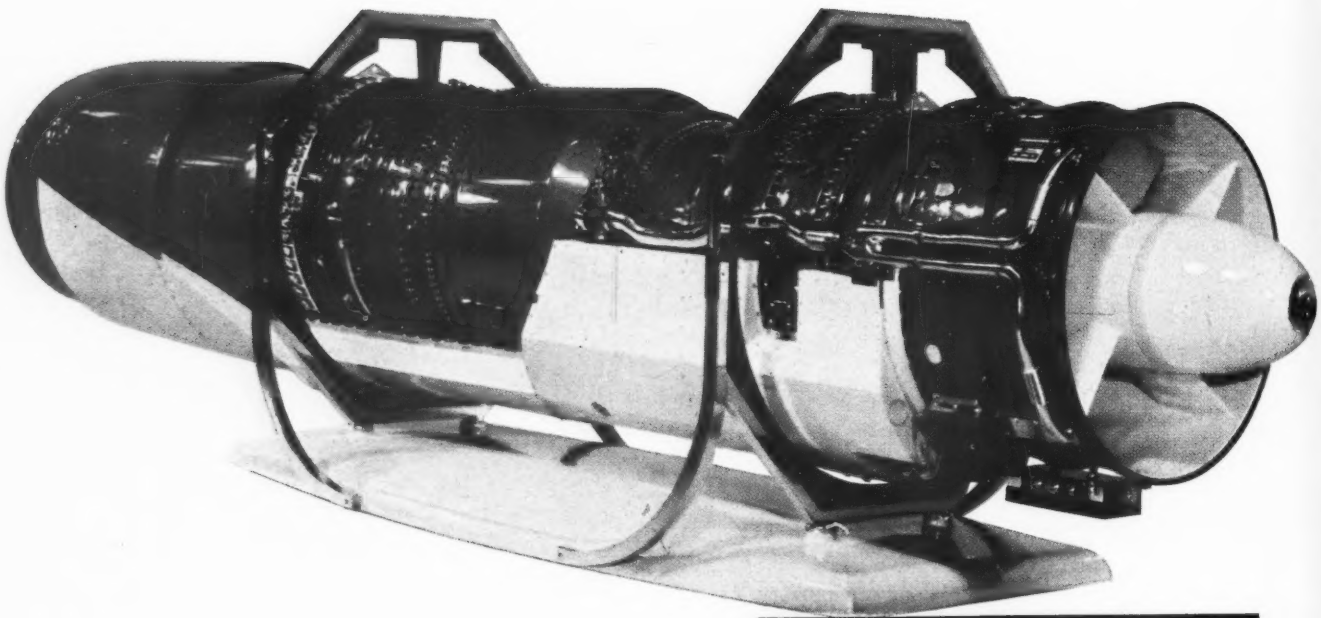
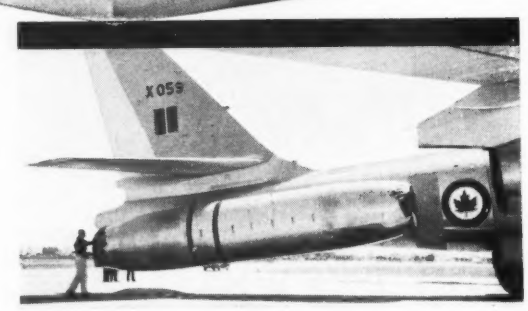


The Iroquois designed, developed and produced by Canadians is the supersonic successor to the Orenda jet engine, 4,000 of which are in service on four continents.



FLIGHT TESTING THE NEW IROQUOIS AT MALTON
The supersonic Iroquois is carried in this specially designed pod at the rear of a B-47.

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tion must depend for its new weapons, to be undermined by a rash of directives compromising efficient and economic performance?

Indeed, does the President really believe the nation has a dynamic research and development program, equal to the threat, when in fact that program has never in recent years been more sluggish, or at a lower ebb? Does he, in fact, truly see the greatest national problem as one of survival in an age of technological competition? In short, when will the President lead the way so we can again become a nation of explorers and pioneers?

Such a nation, for example, should not now be tempted by lost pride to merely duplicate the Soviet satellite too little and too late. Rather, we should accelerate and exploit our ICBM program with giant strides toward the conquest of space.

In this age of giant strides, the military background of the President, when measured against the nation's decreasing military stature, presents an enigma to many who serve him at close range as well as to those who judge him from afar. And yet, the record is there for all to see. Sputnik I merely has served as a catalyst to bring that record into focus.

We do not underestimate the burden carried by the President. However, we are reminded that Winston Churchill, at about the same age, came forth to rescue from incipient oblivion a once-powerful nation that had scorned him for his courage and vision.

Churchill's own words, describing an earlier crisis in his own nation, are pertinent today. He spoke of a time when, "short-sighted opinions, agreeable to the party spirit, pernicious to national interests, banished all purpose from the state."

As Sputnik I circles the heavens, an omen of disaster, only inspired leadership in the Churchill tradition can preserve the Free World.

Why the Russians Beat Us

By Walter Lippmann

THE FEW who are allowed to know about such things, and are able to understand them, are saying that the launching of so big a satellite signifies that the Soviets are much ahead of this country in the development of rocket missiles. Their being so much ahead cannot be the result of some kind of lucky guess in inventing a gadget. It must be that there is a large body of Soviet scientists, engineers, and production men, plus many highly developed subsidiary industries, all successfully directed and co-ordinated, and bountifully financed.

In short, the fact that we have lost the race to launch the satellite means that we are losing the race to produce ballistic missiles. This in turn means that the United States and the Western World may be falling behind in the progress of science and technology.

This is a grim business. It is grim, in my mind at least, not because I think the Soviets have such a lead in the race of armaments that we may soon be at their mercy. Not at all. It is a grim business because a society cannot stand still. If it loses the momentum of its own progress, it will deteriorate and decline, lacking purpose and losing confidence in itself.

The critical question is how we as a people, from the President down, will respond to what is a profound challenge to our cultural values—not to the ideal of the American way of life but—to the way in fact we have been living our life. One response could be to think of it all in terms of propaganda, and to look around for some device for doing something spectacular to out-match what the Russians have done. The other response would be to look inward upon ourselves, and to concern ourselves primarily with our own failings, and to be determined not so much to beat the Russians as to cure ourselves.

The question then might be defined in this way: Why is it that in the twelve years that have passed since the end of World War II, the United States, which was so far in the lead, has been losing its lead to the Russians who at the end of the war were so nearly prostrate? Mr. Khrushchev would say, no doubt, that this is because communism is superior to capitalism. But that answer really begs the question, which is not why the Soviets have moved ahead so fast but why we, who have moved very fast, have not been moving fast enough. For while our society is undoubtedly progressive, it has not in the postwar years been progressive enough.

I do not pretend to know the whole answer to what is for us and for our future so fateful a question. But I venture to think that even now we can discern certain trends that since the World War have appeared in American life and must be taken into account.

We must put first, I think, the enormous prosperity in which, as the politicians have put it to the voters, the private standard of life is paramount as against the public standard of life. By the public standard of life I mean such necessities as defense, education, science, technology, the arts. Our people have been led to believe in the enormous fallacy that the highest purpose of the American social order is to multiply the enjoyment of consumer goods. As a result, our public institutions, particularly those having to do with education and research, have been, as compared with the growth of our population, scandalously starved.

We must put second, I think, a general popular disrespect for, and even suspicion of, brains and originality of thought. In other countries, in Germany and in most of Europe, and in Russia, it is an honor, universally recognized, to be a professor. Here it is something to put a man on the defensive, requiring him to show that he is not a highbrow and that he is not subversive.

What McCarthyism did to the inner confidence of American scientists and thinkers has constituted one of the great national tragedies of the postwar era. It is impossible to measure the damage. But the damage that was done was very great. It was done in the kind of thinking where the difference between creation and routine lies in the special courage to follow the truth wherever it leads.

With prosperity acting as a narcotic, with philistinism and McCarthyism rampant, our public life has been increasingly doped and without purpose. With the President in a kind of partial retirement, there is no standard raised to which the people can repair. Thus we drift with no one to state our purpose and to make policy, into a chronic disaster like Little Rock. We find ourselves then without a chart in very troubled waters.

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authorities have said you will be a
to board a rocket and cross t
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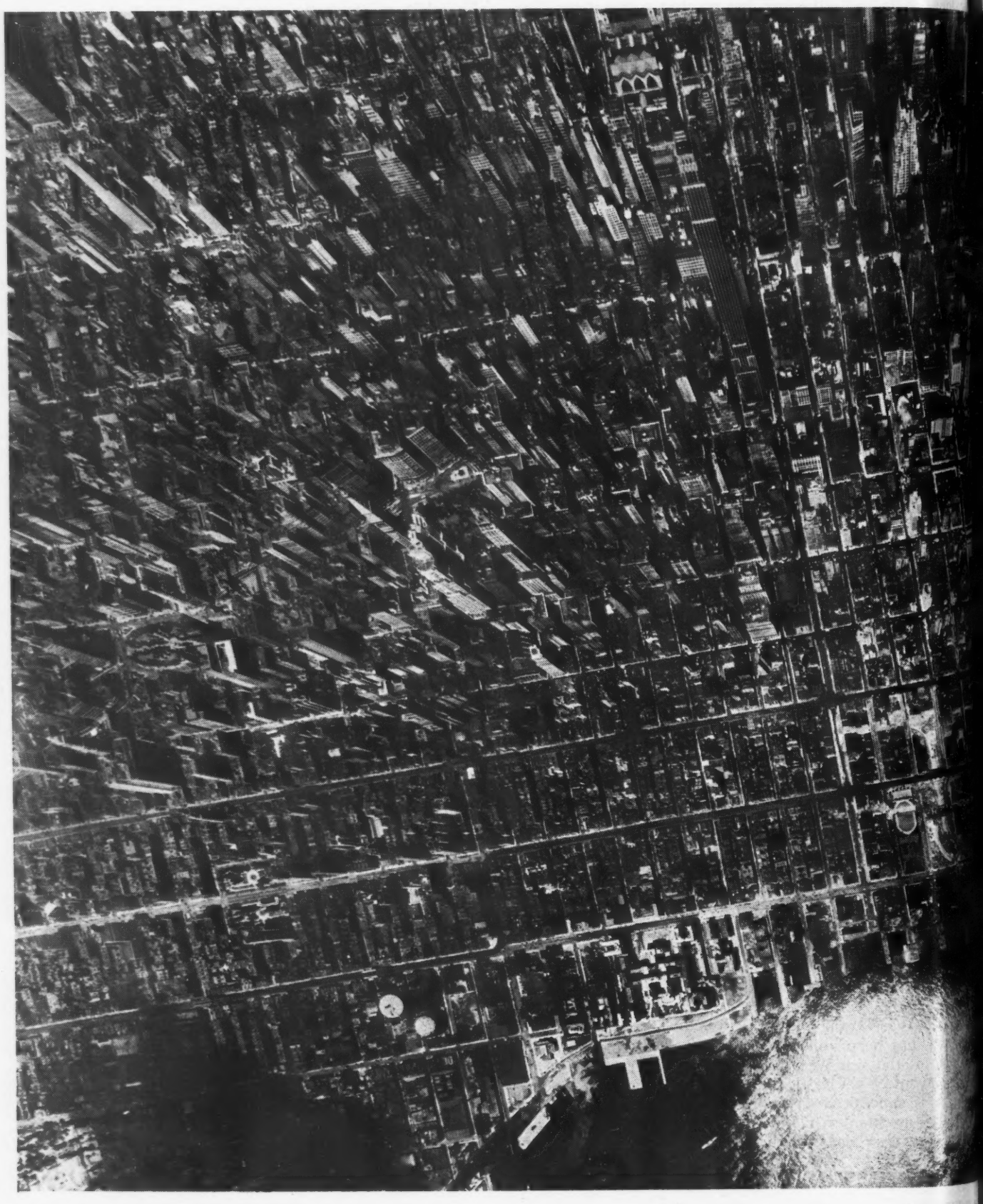
Earth in an hour . . .

This is being brought about beca
of *practical* research on problems th
need answering now. At Douglas,
instance, work to cushion sensiti



instruments against the tons of gravitational pull they meet in a rocket take-off tells much that will help protect passengers in a rocket ship. Improved aerodynamic design for supersonic fighters suggests more efficient airframes for rockets. The control system which will permit directing the Douglas *Thor* missile to a target 1500 miles away leads to controls for tomorrow's rocket ships.

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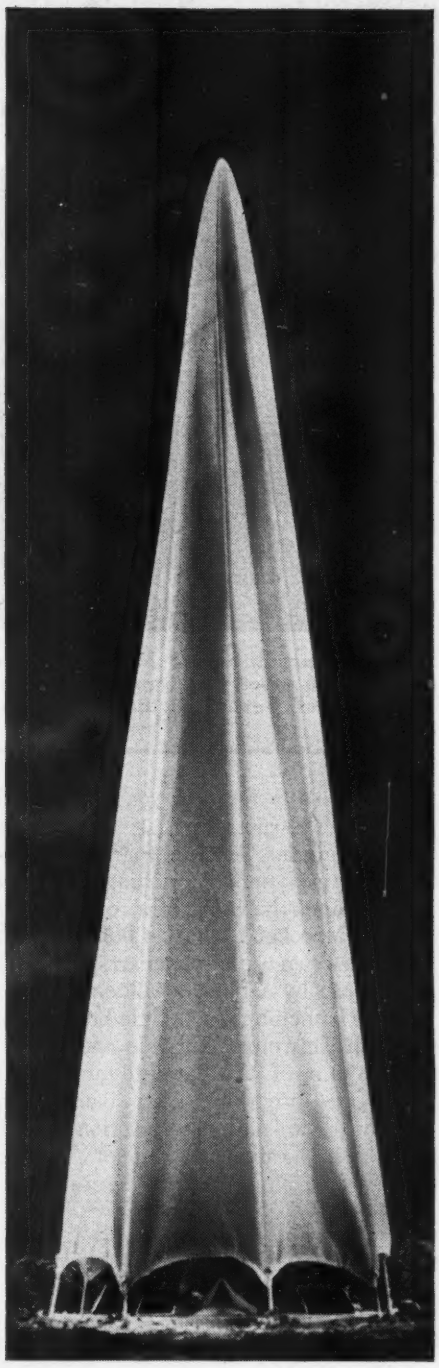
COAST AND GEODETIC SURVEY



Thor, new intermediate range ballistic missile developed for the Air Force by the Douglas Aircraft Company is still a hush-hush project. Thor is designed to carry a thermonuclear warhead at meteoric speeds . . . when operational will supplement the manned bomber force of the Strategic Air Command. Douglas is now building three basic types of rocket and missile: air-to-air, ground-to-air, and ground-to-ground.

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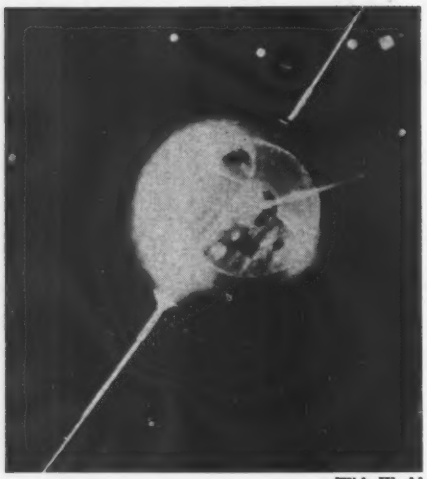
AIRPOWER—IN THE NEWS



Wide World

After Sputnik, what? Man's first venture into space was dramatized by this model of Soviet satellite in Prague.

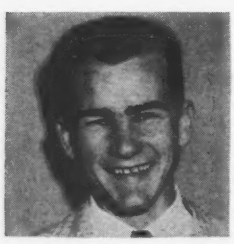
■ With the race for space underway in dead earnest, the Air Force hopes to regain lost prestige for the US with its long-planned launching of **Project Far Side**—the firing of a four-stage research rocket **1,000 to 4,000** miles into space from a platform carried 100,000 feet up by a plastic balloon. The Far Side launching is scheduled to be made from Eniwetok. Far Side and possible speedup of the satellite and ICBM missile programs may well underscore the national reaction to the growing threat of Soviet scientific prowess, symbolized by **Sputnik.**

■ The main striking-power of the RAF, nuclear-weapon-carrying **Vickers Valiants** and **Avro Vulcans,** are scheduled to compete in **SAC's 1957 bombing competitions** at Pinecastle AFB, Fla., this month. Two each will be used in the contest. The Vickers Valiant, a four-jet medium bomber, powered by four Rolls Royce Avon turbojets, with a thrust of 40,000 pounds, dropped Britain's first H-bomb in the tests off Christmas Island earlier this year. The Vulcan, popularly known as the "flying triangle," is a four-jet delta, powered by a Bristol Olympus engine, with an approximate thrust of 50,000 pounds.

■ A possible bright spot in the welter of Soviet satellite news was the contention of Russian-born French scientist **Alexander Ananov,** founder of the **International Astronautical Federation,** that the **Sputnik** will never be of **direct espionage** value to the Russians. Photographs of the earth **taken from even a manned satellite** would be worthless, he says, because of the lack of detail obtainable and the cloud layer that covers this planet. But he tempers this happier news with the assertion that knowledge obtainable about the upper atmosphere and outer space is invaluable for computations of the **trajectory of ICBMs.**

■ Worth repeating in the light of Soviet attainments is the dispassionate warning in USAF Deputy Chief of Staff **Lt. Gen. Clarence S. Irvine's** recent address to the **National Aeronautical Symposium.** Said the general: "The US will win or lose the decisive phase [of any future war] with **what it has on hand** at the outbreak. . . . We will not have time to build up our forces. . . . We have had to abandon reliance on long-range industrial mobilization. Potential is no longer adequate insurance."

—BILL LEAVITT



The honor of being the 500,000th volunteer enlisted by the Air Force since it became a separate service went recently to twenty-two-year-old Richard Jack Drnec of La Grange, Ill., son of Mr. and Mrs. Joseph Drnec. Airman Drnec's enlistment began with a phone call from La Grange recruiter T/Sgt. Paul E. Robbins. He was sworn in by Lt. Col. LaVerne L. Cheney. The enlistee was feted by the Air Force and appeared on TV prior to leaving for basic.

The Air Force lost one of its most devoted employees, when Miss Edna M. (Suzie) Adkins died in Washington, D.C., in mid-September. An AF employee since 1923, Miss Adkins had served as secretarial and administrative advisor to seven AF chiefs of staff. Among the honors she gathered in her long career was her selection by the AFA to represent all AF civilian employees at AFA's August convention. Last June, she received the US Exceptional Civilian Service Award. The Civil Service League had honored her also.

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WHERE THE FUTURE IS MEASURED IN LIGHT-YEARS

AIR FORCE
NOVEMBER 1957

Death of a Colonel

By John F. Loosbrock
MANAGING EDITOR, *AIR FORCE* MAGAZINE

WE WERE a few minutes late for the funeral. It was a long drive from our Maryland home and the kids had to be started off to school before we could leave. I had not spoken during the trip through the crushing Washington morning traffic and my wife respected my silence.

An October mist swirled bleakly around the crowded gravestones of Arlington National Cemetery. But just as we arrived the sun burned through, touching with gold the towering steeple atop the Fort Myer chapel.

The chapel was damp and chilly, austerely interdenominational. The Requiem Mass had begun and above the plaintive chords of the organ one could hear snatches of priestly Latin and the murmured responses of the acolyte.

"Requiescat in pace."

"Amen."

Among the pallbearers it was easy to spot the silver thatch of Gen. Nathan F. Twining, still new in his job as Chairman of the Joint Chiefs of Staff. The dead officer had served General Twining as Special Assistant during his four years as Chief of Staff of the Air Force.

The sermon was brief, in the Roman Catholic tradition. As full military honors demanded, a band and honor guard led the funeral procession in slow cadence to the freshly-dug grave on a wooded slope. Close by lay the grave of Gen. Hoyt S. Vandenberg, former Air Force Chief of Staff.

Aircraft from nearby National Airport droned overhead as three volleys rang out and the mournful notes of "Taps" sounded through the trees.

Colonel Leo Francis Paul, United States Air Force, 3822A, had stood his last formation.

* * *

Pat Paul was my friend. He lost his life in the crash of a C-47 which went down near Washington, D. C., just a few miles from my home on October 2. He was exactly

(Continued on following page)

two weeks from his forty-second birthday. It was what the Air Force calls "a routine training mission."

Partly I am writing this because Pat was my friend. But mostly I am writing it because to me he exemplified the Air Force officer at his best—a brilliant, dedicated, practical visionary with the highest sense of duty I have ever encountered. His death was a great personal loss to his family and to his friends. Beyond that, it was an even greater loss to the Air Force which he loved and to the nation which he served so selflessly.

° ° °

The official records give only the bare outline of a man's life. But you can read between the lines—if the man was your friend.

"Born 16 Oct 1915, Wilton Junction, Iowa." A rural boyhood in the finest farming country in the world, where the black loam runs deep and rich as butter. Fishing for channel cat in the brown streams, and swimming there, too, without worrying about a bathing suit. Walking barefoot in the thick dust of a back road. Playing cow-pasture

WHAT'S THE LEAD TIME?

By Lt. Col. F. D. Henderson, USAF

How long does it take to kill a good pilot? An instant? Yes, an enemy bullet can do the job. This is a fine, worthwhile way to die.

Several seconds? Yes, an engine fire or a fuel system failure can accomplish that one. That isn't a bad way to die either. Unforeseen emergencies are part of the game. That's why we get flying pay.

Three to five years? Yes! Unfortunately, regrettably, and damned sorrowfully—yes. Even worse—*avoidably yes!*

This is the long-lead-time death that shocks us deeply when we lose a friend for no decent reason. This kind of death is the worst imaginable waste—because it could be prevented.

I have just attended the funeral of a man who died such a death. Colonel Pat Paul was one of the closest friends I'll ever have. I know that all of the people at his funeral considered themselves blessed in the same way. He was that kind of man. Everyone felt that Pat was something special; and Pat, in turn, made every friend feel very special and important.

There were no "duty" appearances at today's funeral. As they listened to the last notes of taps, all present, from General Twining to Airman Charlie Bond, Pentagon E-Ring messenger, felt the impact of the loss of a real friend.

Right now, as I think these thoughts, I am, ironically, a potential victim of the same deadly lead time. I am riding in a C-47—"safest plane in the Air Force." At the controls are two command pilots with many years of experience, thousands of flying hours, and plenty of flying time in the venerable gooney bird.

As we boarded the aircraft, the pilot, a colonel, told me of the most recent limitations clamped on headquarters pilots. Many pilots are now limited to *one* flight a month!

Why do we keep our headquarters pilots flying at all? This question is constantly asked by those who do not understand the Air Force.

Every endeavor must be led and staffed with experts. Certain key executives in hospitals continue to diagnose, treat, and operate. Certain college and university leaders continue to teach and write. Senators and congressmen, even after elected and securely in office, continue to practice basic politics at basic levels.

And so it is in the Air Force. Our executives fly because the Air Force is a flying business. When the day comes that the Air Force is not primarily concerned with flying, then it may be ably led by nonpilots. But not before. For the present and years to come we must be led by pilots who are active flyers with up-to-date, personal knowledge of our primary business.

baseball. Threshing oats and shucking corn. Driving the horse that pulls the laden hay-hook into the gaping barn mow.

"Permanent Address: 410 Iowa Avenue, Iowa City, Iowa." The move to "town" after Dad lost an arm in a corn-picker. Shady streets in a quiet university city. Football practice in a cavernous stadium. Phi Beta Kappa. An ROTC commission, second lieutenant, Infantry, United States Army Reserve. Commencement, June, 1936.

A year's active duty with the Civilian Conservation Corps. A stint as sales manager for a fountain pen company. World War II and active duty.

° ° °

Pat started flying comparatively late in his military career. He entered flying training in May 1942 as a first lieutenant. Like thousands of others, he won his wings at Randolph Field (in January 1943) and was on his way to the South Pacific in May.

With the 5th Air Force he logged 706 hours on 209 combat missions, and picked up three Distinguished Flying Crosses, an Air Medal, a Bronze Star, and two Purple Hearts, in seven campaigns. His last wound was sustained in the Philippines and was severe enough to send him back to the States in February 1945.

His last two assignments were an indication of the high regard held for the quality of his staff work—Assistant to the Deputy Chief of Staff, Plans and Operations, SHAPE, Paris, 1950-1953; Special Assistant to the Chief of Staff, USAF, 1953-1957. At the time of his death he was a student at the National War College, the nation's highest military school, an indication in itself that he was earmarked as a future top Air Force leader.

° ° °

Why am I bothering to set all this down? Pat Paul would have been the first to say, "Sing no sad songs for me." But one can talk a bit about the things Pat believed in, the things which made him tick, in the hope that the discussion may help shape the career of a future Pat Paul and that the nation may thereby be the richer.

(Continued on following page)

Colonel Paul was such an executive in the Air Force. Although he had not occupied a cockpit assignment for several years, his staff duties required intimate knowledge of air operations and continuing flying experience. However, he was under the same sort of flying hour limitations that apply to all staff officers. In the accident in which Colonel Paul was killed, the pilot who was actually at the controls was in a similar staff position under the same flying limitations.

In this tragedy, the end items were three dead pilots. The lead time was three to five years. The production line—a CRT flying system that does not allow staff pilots to fly enough.

One or two flights a month simply are not enough to keep even an experienced 4,000-hour pilot proficient, to say nothing of younger men who will never reach 2,000 hours if present trends continue.

It is impossible to measure with scientific accuracy just how fast a pilot loses proficiency or how much he loses on this diet of reduced flying. There will always be strong pilots who fly more skillfully on four hours a month than weaker pilots who fly much more.

No one can prove that a particular accident was due solely to the fact that for the last few years the pilot had been limited to minimum flying hours.

But Air Force records do show unmistakable correlation between accidents and current flying experience, and we who fly need no statistics to understand that four hours, month after month, are not enough, even to fly a gooney. Neither is 100 hours a year.

Now lead time on any end item is composed of more than production time. Let's go a step further back and take a look at the design and development of this end item—a dead pilot, a lost friend.

There is always one item that is fair game for slashing in every Air Force budget. This is the flying hour program or the money for operations and maintenance. The Air Force tries, in the budget hearings, to avoid losing too much operations and maintenance money, but to little avail. The attitude of most nonpilots is that pilots fly too much and most of our senators and representatives are not pilots.

And so, inadvertently, through ignorance and most certainly not on purpose, the end item—a dead pilot—is unconsciously conceived and developed by designers who do not and apparently never will understand the problem.

So for the present, and for many years in the future the four-hour-a-month production line will grind out a lost husband here, and a dead brother there. Like all production lines, the longer it operates, the more efficient it will get.

And to absolutely no purpose! The whole system, designed to save dollars, costs many times over savings in lost men and planes. Even worse, there is no measure of leadership and experience lost. We will feel this loss badly if there should be another war.

Like any one, I am indignant when I lose a friend for such an ironic reason. I am indignant enough to suggest that our Special Air Mission transports, which haul VIPs hither and yon, be manned by four-hour-a-month pilots. I am only suggesting that others be given the same privilege, the same gamble, as we who live and die with the system. Perhaps this would give the distinguished passengers a little better feel for a situation which we know so well.

Forgive my bitterness, as I ride home in this gooney bird behind two colonels who probably aren't so sharp at flying as they could be or once were. Pat Paul was a victim of this kind of ride. He is gone and my heart is heavy.—End

° ° °

Colonel Henderson worked closely with Colonel Paul for more than three years in the Pentagon, a length of association relatively rare in the Air Force.—The Editors.

Above all, Pat Paul loved his country. Not in a narrow, chauvinistic sense, for the chinks in our democracy irritated him. But he believed passionately in the innate dignity of the human spirit and saw America, with all its faults, as the finest, even though imperfect, reflection of that dignity. It was a love that colored his every act and that formed the basis for the furious abandon with which he hurled himself into every task which came his way.

Pat Paul loved his Air Force. He saw it as the ultimate military expression of American national policy, both sword and shield of the Free World. Yet, his was not a selfish, parochial love. He freely acknowledged and would vehemently defend the viewpoint of a sister service whenever that viewpoint appeared to have the force of logic and justice on its side.

Pat Paul loved flying. He was an excellent pilot. But he never allowed the romance of flight to blind him to the bitter realities of the technological revolution. He was an officer first, a pilot second, and a "wild blue yonder fly-boy" in no sense of the term. He understood the need for basic research, he could visualize the coming age of missiles with no disquieting fears of technological unemployment. At the same time, he saw clearly the need for force-in-being and realized that the transition from manned aircraft to missiles would be a long, expensive and, at times, unsettling proposition.

Pat was a true professional. He knew his trade and could handle the tools of it with a sureness born of complete self-confidence. Yet, he was never too busy to lend a helping hand to those whose lesser competence made them less sure of themselves.

He was articulate. He had the rare ability to convey his beliefs in a manner which carried conviction, whether writing or speaking. He rightly felt (and this is a characteristic far too uncommon in the military), that the ability to express oneself clearly, concisely, and convincingly was as essential to his profession as an understanding of strategy and tactics.

Pat was tireless, as only a dedicated man can be. He drove himself unsparingly, often on jobs which technically were none of his business but to the success of which his contributions were indispensable. Few persons, even those with whom he worked daily, were aware of the total extent of his activity in pursuit of what he thought was right and needed.

Undoubtedly these qualities are combined in many men. But of all the Air Force officers whom I have known none combined them so dramatically as Pat Paul.

Lest I leave the impression that he was a stuffed-shirt paragon of all the virtues, let me add that he was a fast man with a quip, and could play with the same concentration he devoted to his work. I remember a party in Pat's honor, given on the eve of his entrance into the National War College in September. We gagged up some presents around the theme of "back to school" and one of my last and fondest memories of Pat is in a size 48 sweatshirt, with National War College stenciled across the chest, just above a huge picture of an aircraft carrier.

A courageous guy, Pat Paul, of a type vividly portrayed in a poetic essay by AFA's own Gill Robb Wilson, past president of the Air Force Association, editor and publisher of *Flying* Magazine. It is called "Courage" and appears in Gill Robb's latest book, "The Airman's World":

God loves the brave. At my mother's knee
I learned it from the Book of Remembrance. To serve
"with all thy heart and all thy mind and all
thy soul," one must go into the high places to hear
voices; one must search lands of new promise;
one must face the unknown with confident heart;
one must battle giants and one must be ready
to die in the very dawn of a brighter day . . .

The poets and minstrels are at a loss
to sing our sagas. There have been no high casements
from which to follow our questing;
no battlements from which to mark our strivings.
The airman forges the fates in a vast loneliness.
The horizons swallow him.
His spoor is a flick of light in the sun
or a murmur of overtone in the wind.
And when the people send us forth to war,
there drifts down from the misty sky somewhere
the flotsam and jetsam
that hints of the living or the dead,
the victor or the vanquished—
and that is all. God, who loves the brave,
is alone with the brave.

The kind of bravery Pat Paul typified was expressed in a different way by his former boss, General Twining, in a speech to Air Force Academy cadets last winter. He had been discussing the tradition of courage, pointing out that there were many kinds, not the least of which he described as follows:

"There is yet another kind of courage that is perhaps even more rare. This could be called by many names: moral courage—the courage of one's convictions. It is the determination to hold to one's principles in the face of ridicule and strife . . . Acts of moral courage are, in a way, even more impressive that flying exploits of sheer physical courage . . ."

General Twining's speech then went on to outline the qualities the Air Force needs in its future officers:

"A broad understanding of national and international problems above and beyond Air Force problems will be required of those who must convince our national leaders of the nation's requirement for airpower. Conviction does not follow assertion. It comes first from the acquisition of that kind of confidence that educated men of character inspire in each other. Second, it comes from the ability to explain and convince. This ability must be based on a broad knowledge of the total picture.

"Airmen have developed a motto which is, in essence, this: 'To proceed unhampered by tradition.' It was the recognized need to break away from traditional concepts and methods of warfare that led Douhet, Mitchell, and Arnold into their lifelong battles against the established order. In other words—what's good today may not be good tomorrow. We must fight the tendency to hang on too long to favorite weapons and tactics.

"As long as man is inventive enough to produce new equipment of combat utility, there must be other men who are quick to foresee its potential, and who are able to develop new concepts for its most effective use in the defense of our nation.

"We are in the midst of a great revolution in weapons. But perhaps the greatest revolution of all has come about as a result of airmen who created change, and then adapted themselves to this change. The ability to do this in the future may determine how well we can achieve our most important national goal—which is peace—real security."

The author of this speech might well have been writing about himself.

For Pat Paul wrote it.—END

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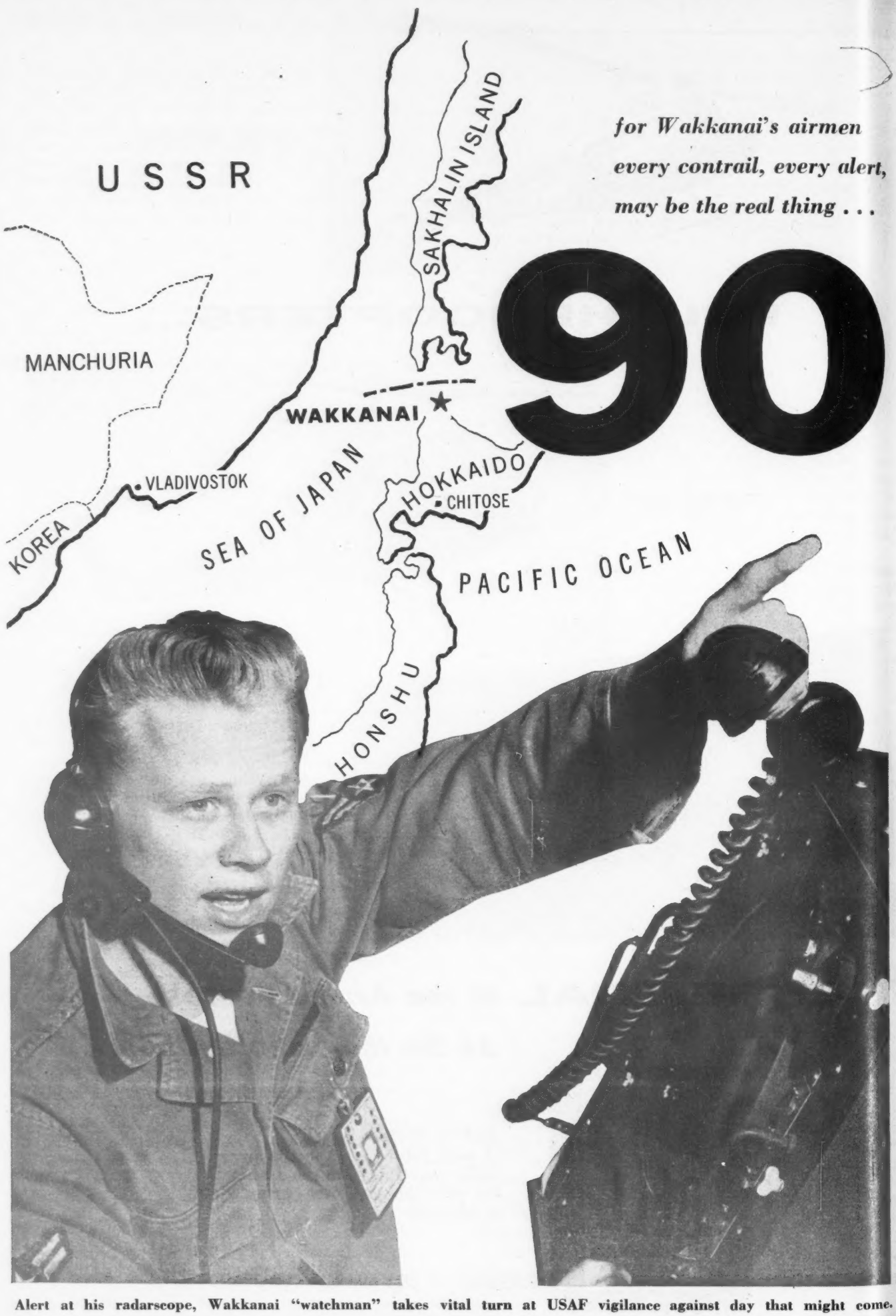


Alert at his radarscope, Wakkanai "watchman" takes vital turn at USAF vigilance against day that might come.

The warning from the Wakkanai radar sets USAF pilots at nearby Chitose AB scrambling for their Sabrejets. When alarm goes on, they never know whether it's the real thing this time.

SECONDS TO LIVE

By Michael Gladych

THE contrails came from Siberia, crossed the Sea of Japan, and now ominously point at you. Your binoculars focus on three specks that spin the vapor-like spiders in search of their prey—the Russian light jet bombers.

A few feet away in the dimly lit control bunker on top of the Wakkanai hill, at the northern end of Japan's northernmost island, Hokkaido, US airmen watch the fast-moving blips on their radarscopes. Over the tense hum of the air conditioner the scopemen read off the Red jets' course.

"Alpha-Bravo-two-seven-four-one—time two-six."

The radar controller picks up his phone. "Broomstick Two—vector three-three-zero – angels four-seven – speed six hundred."

Now the scopes "paint" another blip, far to the south. That's the "Broomstick" F-86 Sabrejets, scrambled from Chitose fighter base to intercept the Russians. The two blips—the Russian bombers and the Sabrejets – converge. The radarmen lean forward.

Suddenly, the Russian blip veers away just before crossing the boundary line of our defense sector.

The controller sighs with relief. "Break off, Broomstick—break off. Thanks a million. Over."

Still watching the retreating Reds, one of the scopemen says, "Another damned trip-tease." It's supposed to be a joke, but nobody laughs. For although the "trip-tease" is a daily drama at Wakkanai Air Station, the radarmen never know if this time the Russian jets are playing it for real.

"It's like being the target man for a sideshow knife thrower," as one airman puts it. "You know the joker is damned careful not to hit you. But maybe he didn't sleep so good last night—maybe he is a little jumpy. A little accident and you're a little dead."

As Gen. Laurence S. Kuter, now Commander in Chief of the Pacific Air Forces says, "Wakkanai site is one of the most important in our defense." And this is why.

Wedged deep into the Soviet air base complex, Wakkanai radar can practically "see" the Red pilots run for their jets on several Russian airfields. This kind of information is invaluable for our intelligence. Of course, it follows that the sixty-odd "watchmen" of Detachment 18, 848th Aircraft Control and Warning Squadron, would be the first to warn us of a Russian attack in the Far East. And they would suffer, probably, the first casualties.

So long as the cold war stays on ice, all the Russians can do is keep the watchmen on edge with their trip-tease acts. But should the Kremlin decide on open warfare, there are long-range guns and rockets already zeroed-in on the lone Wakkanai outpost.

How does it feel to live on a bulls-eye? Well, the watchmen know about the Red artillery and rockets, but they haven't got time to sweat about it. They are too busy fighting another enemy—the weather.

During the nine-month winter, 100-knot gales bury the radar bubble and the camp under twenty-foot snow drifts. Power lines go down, and the water supply freezes. The other three months there it is either fog or rain. When the sun does make rare appearances, Wakkanai camp gets a choking gas attack from the "honey buckets"—the offal from nearby canneries.

While fighting the Wakkanai weather war, the watchmen must keep their radar sets and their radio relay stations on the air around the clock. To keep the "scope dopes" watching their sets, the "static chasers" passing radio messages, and the diesel generators feeding the juice for so much electronic gear, the maintenance crews work hard, sleep little and lightly.

The spare parts problem—pumps, tubes, and condensers to be replaced in a hurry—are a constant headache for the supply men, whose nearest depot is some 200 miles away. Japanese roads, especially on Hokkaido, look good only on the map, and if a truck gets stuck in one of the highway hell-holes, it takes a deep-sea diving team to fish it out of the mud.

The camp's main gate is at the last stop of the rickety bus from Wakkanai

(Continued on following page)

At left, the main gate of Wakkanai, where everyone entering must pass stringent identification check prior to admittance. Japanese policeman assists at the gate.

Above, the back gate at the air station, and the beginning of "Spiller Turnpike" up the hill, traveling of which calls for skis and the endurance typical of USAF airmen at Wakkanai. Heavy snow is just one of weather problems at the station.

town, and, arriving, you get that end-of-the-line feeling, for this is the tip of the Wakkanai peninsula and the snow-capped peaks visible across the murky sea are on the other side of the Iron Curtain—in Sakhalin.

Huddling under a bleak hill is the camp—a handful of green-painted Nissen huts and wooden, one-story barracks. Most of them are interconnected with narrow corridors leading to the mess hall—an arrangement the airmen appreciate in the heavy winter snow. Those hand-holding barracks hide the usual camp traffic and the place looks deserted except for a few Japanese mechanics at the small motor pool. You can easily cross the entire camp from the main gate to the back entrance in minutes. And about three miles away, along a steep, winding trail, the radar tower keeps its bulging eye on the Kremlin's backyard.

An Air Force blue "six-by" truck stops at the back gate. Bundled in a parka, Capt. Ed Spiller, the maintenance officer and the "First Mate" of Detachment 18, leans out of the cab. "I'm taking a new shift up the hill—hop in," he says.

From the camp level, the hill doesn't look too bad, but from the truck's cab it feels like the climb on a roller coaster before that first big dip. With the engine grinding in low gear, the truck noses up toward low clouds. The watchmen in the back of the truck automatically balance against the impossible angle and anchor themselves to the stanchions.

"Good thing we can't go any faster," laughs Spiller. "At this angle we'd overshoot the bubble and wind up in outer space."

Spiller, a dark, lean "Downeaster" from Maine, has a favorite trick he plays on the rare visitors to the Wakkanai hill. Driving nonchalantly with one hand, he drops a casual remark, "The other day the brakes failed—just about here."

The visitor looks down the precipice and quickly turns his head away.

"Don't you want to know what happened?"

The visitor grabs the door handle.

Lightheartedly, Spiller goes on. "Well, there's a water reservoir down there—on the bottom," he says. "We've never found the truck or the men. But the water has been tasting peculiar ever since. Maybe you've noticed. Once I found a hair in my water glass. Blond. Crew cut."

When his passenger is about to bail out, Spiller breaks into a laugh. "Didn't mean to scare you," he says. "It didn't really happen." Then he adds. "But it could, you know."

A stalled snowplow "Cat" balancing precariously on the road's edge and a bogged-down truck a little farther on bear mute testimony to the rough going on "Spiller Turnpike," as the men call the trail to the top of the hill. Even though most of the winter snow has melted, we can't drive all the way up. The slush is too much for the sturdy six-by, so we walk the last hundred yards.

It's a comparatively calm day, but you still have to brace yourself against the Siberian breeze as it tugs at you with powerful eddies at the foot of the radar tower. It was at the entrance to this tower that A/1C Paul G. Brodeur, a radar maintenance man, fought a duel with a ninety-knot gale last winter.

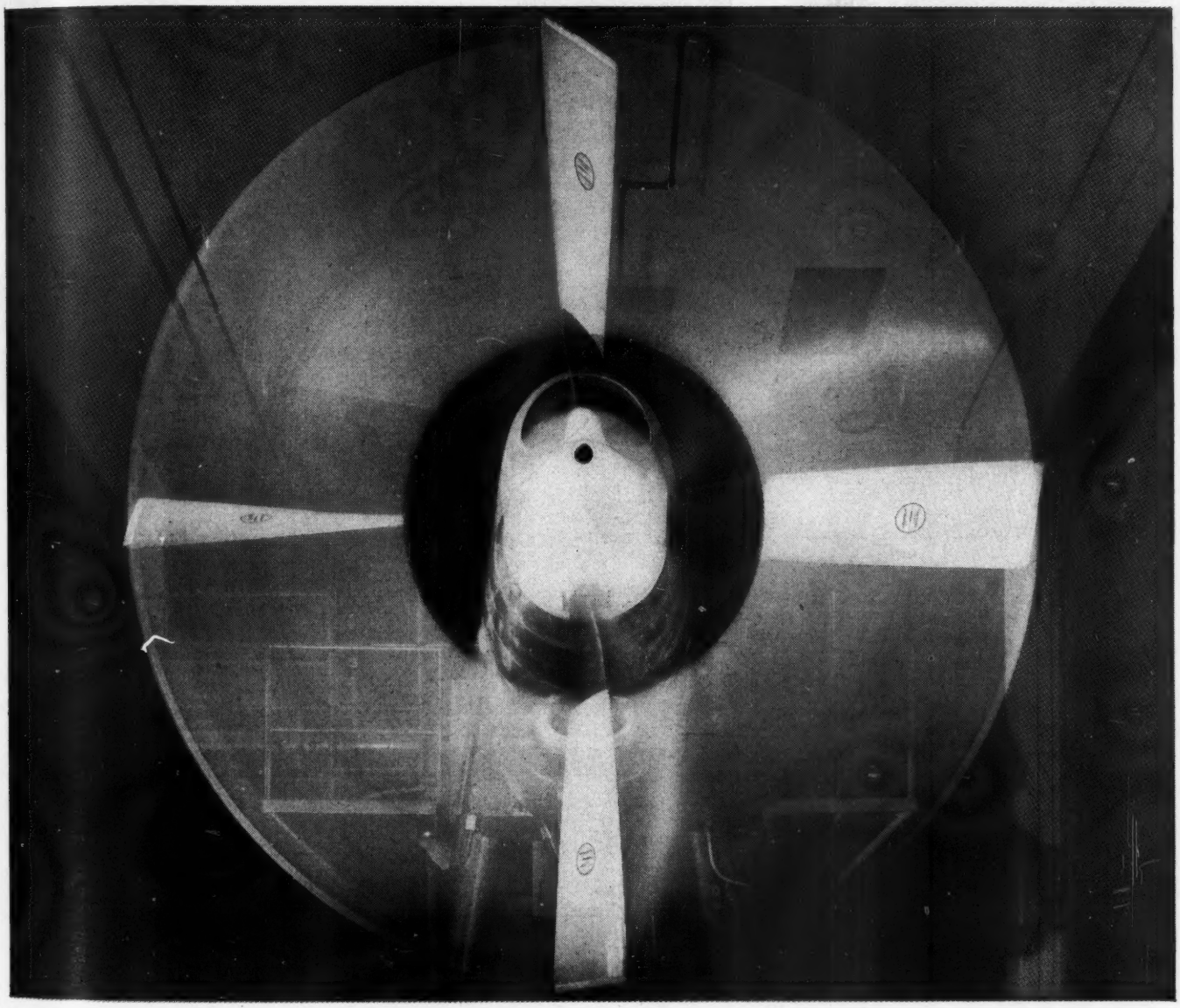
Watching those Soviet contrails, signs of what could really happen tomorrow.

Brodeur was on his way to fix an antenna. Holding down his parka hood and leaning into the gale, he made his way to the concrete porch of the tower. As he started to climb the steps, a gust of wind picked him up, carried him across the nine-foot porch, and slammed him against the corrugated steel wall.

Bruised and aching, Brodeur crawled back to the steps. The wind pushed him down, but he kept on

(Continued on page 53)

The Matched General Motors Power Team of Allison Prop-Jet Engines and Aeroproducts Turbo-Propellers Marks Another Milestone by Receiving CAA Approval for Commercial Operation



CAA AFFIRMS DEPENDABILITY OF ALLISON PROP-JET POWER. Another major step toward commercial airline operation of Allison Prop-Jet power in the Lockheed Electra has been accomplished with the on-schedule approval of the Allison Model 501-D13 Prop-Jet engine and Aeroproducts 606 Turbo-Propeller by the Civil Aeronautics Administration. Backing up the qualification test were 80,000 hours of development time on test stands, over 75,000 hours of experimental and service flight time and testing of engine components for an additional 50,000 hours. Approval of the CAA brings one step closer airline operation of this matched General Motors power team for the jet age in air transportation.

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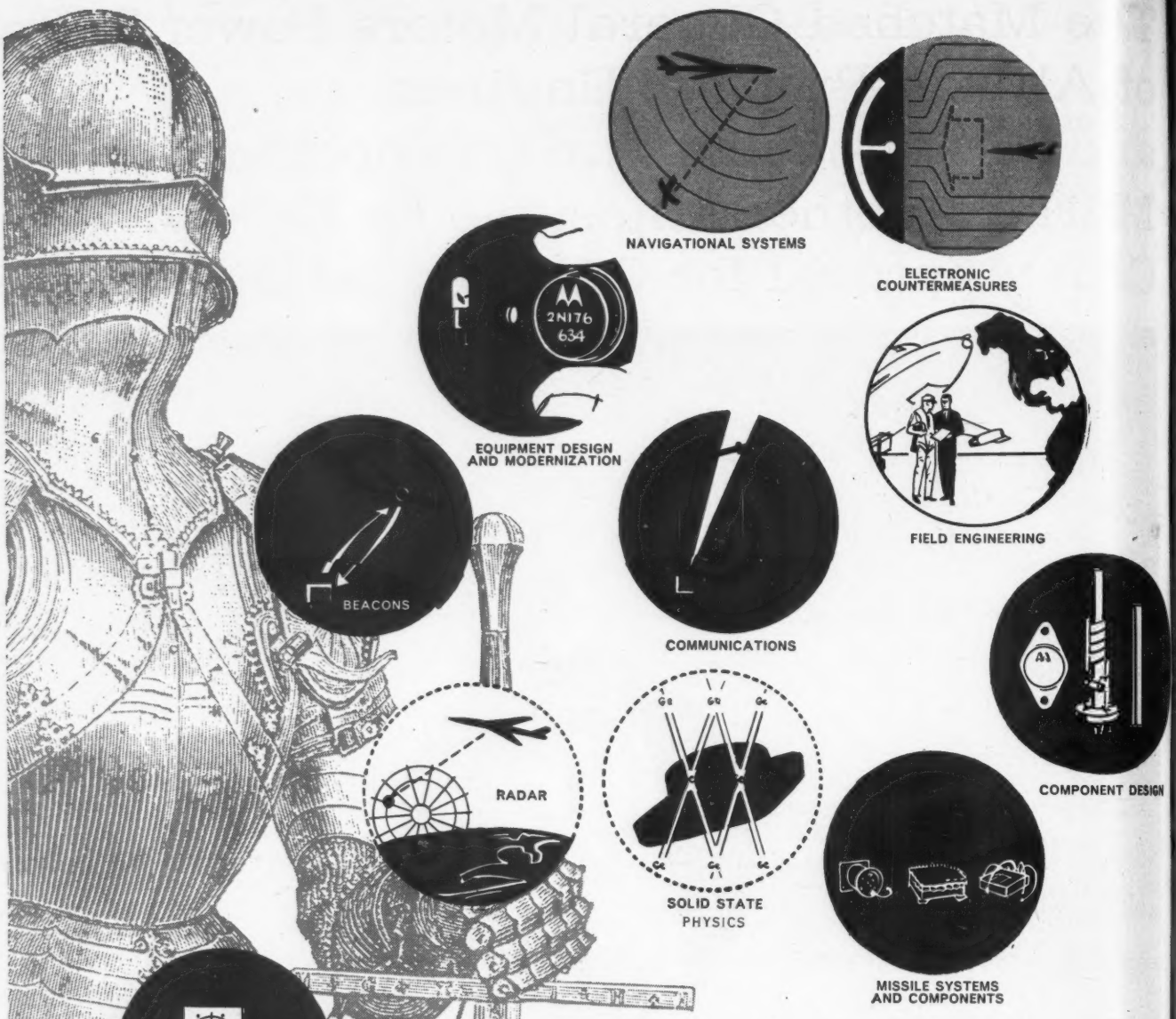

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trying until he made it inside. He fixed the antenna before he collapsed.

"I'm no hero," he says. "That job had to be done. With the antenna on the blink, the guys in the bunker couldn't work their scopes."

If you want to get into the control bunker and live to see what's going on inside, you'd better speak softly, move gently, and have your ID card right handy. For the airman who opens the steel door sticks his .45 "grease gun" at you—his finger on the trigger—no fooling.

Capt. Jack Miller, the Detachment's CO and the radar controller, greets you at the bunker. "Sorry about the lethal hardware," he says. "This bunker is the nut of our operation. We can't take any chances."

The door slams shut behind you and the concrete walls close in. Along a narrow corridor you pass the radar and radio maintenance shops, crowded but shipshape. You peek into the switchboard room and climb a few steps onto the radar control balcony. When your eyes get accustomed to the semidark, you see the "scope dopes" watching the PPI sets (Plan Position Indicator) and the Height Finder set.

Under the far wall of the control room (which isn't very far—fifteen feet or so) there is the transparent plotting board—a kind of a skeleton map showing the outlines of the Siberian coast, Sakhalin Island, and, of course, Hokkaido Island with Wakkanai on its tip. If you focus your eyes through that plastic sheet, you'll barely see the plotter. The plotter is plugged in on the "scope dopes" who read the aircraft position off their PPIs. As he gets the messages, he draws the tracks in glowing crayon. He does it backwards—like the TV weather girl.

Beneath the control balcony sits the "teller." Like his banking namesake, he is a stickler for figures. He keeps an eye on the plotting board and passes the information in code by radiophone to the direction center a couple of hundred miles away.

Captain Miller sits at his controller's console. Looking over his shoulder, you see the "sweep"—a slim pencil of fluorescent light that goes around the scope with the smoothness of a second hand on an electric clock. That's the electronic picture of radio waves the rotating antenna sends into space. As the beam bounces off the objects in its path—terrain, planes, etc., the sweep "paints" ghostly contours of coastlines. An aircraft shows as a blip—a sharp pinpoint of light—the kind you get after you switch off your television set.

Miller points to a couple of blips over Sakhalin. "Looks like a training mission," he says. "Probably shooting landings. See how they go around the field?"

The Russian blips stay over Sakhalin, and there is no cause for alarm. Yet Miller's deep voice is tense. "You never know when those boys get orders to head for us," he says. "So we play Peeping Tom on them all the time."

The shift on the hill ordinarily lasts eight hours, but the two scope dopes always on duty have to be relieved every forty minutes or so.

"By the end of your stretch you fall into a scope spin," A/2C Bill Minton, a radar crew chief, tells you. "They carry you off stiff with your head going around."

But in the winter even the tracked "Weasels" can't get to the hill. The relief shift don their snowshoes or skis and walk up—or try to. On many occasions, the trail disappears under the snow drifts, and the blizzard drives the men back to the camp.

"You go on a shift and it's like shipping overseas," says A/2C Bill "Country" Howard. "You've got to carry a load of C rations and you never know when you're going to be back. Just to walk up that hill takes you almost two hours."

"Yeah, and what happens when you finally get back?" chirps in A/2C Wayne Ippolito, a "static chaser" from Brockton, Mass. "You hardly have time to stretch in your sack and in comes Sergeant Frizzell and gets you up to dig snow."

M/Sgt. Edmond "Lefty" Frizzell, the "top stud" of the detachment, has a way even with the exhausted watchmen. "I hate to pull them out of their sacks," he says, "but the damned stuff piles up so fast that if we didn't dig all the time, we'd be snowed under for the duration. 'Course, I know how bushed those kids are so I make a big joke about it and sure enough, they get up and shovel—no sweat at all."

In spite of Lefty's psychology and the efforts of his men, the snow always wins in the end. The men have to tunnel their way out of the barracks, and only the crosstrees of the telephone poles stick out of the buried camp site.

One winter, Lefty recalls, a bird colonel from higher headquarters came to inspect the camp's security measures. "Sergeant, the camp is supposed to have a twenty-foot fence," the colonel said firmly. "How come you haven't got one here?"

Capt. Jack Miller at Chitose checks radarscope as Sabrejets answer alert.

Lefty, never at a loss for words, said, "We do, sir. You're standing on top of it."

The camp is supplied by the Wakkanai town electric power. Of course, when a blizzard knocks off some wires and covers up others, the power goes off. And no electricity—no water.

"What do you do in an emergency like that?" you ask.

"Emergency, hell—this is our winter SOP," answers Captain Spiller. "We use *sake* for a whiskey chaser—tastes good and works twice as fast. The only problem is shaving. You see, it's dark in the latrine and we have to do everything by braille. Shaving with

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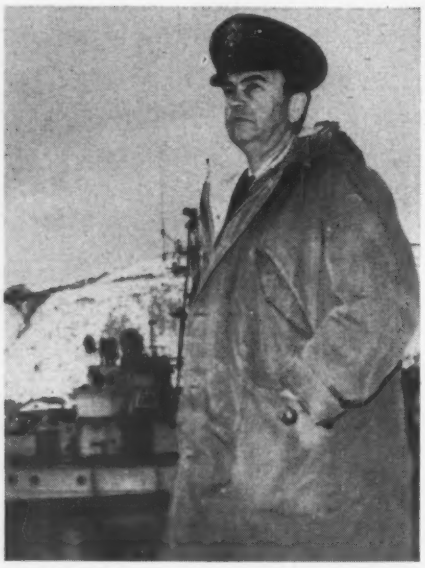
Medical technician Bill Porter, "doctor" to Wakkanai's men, answers call.



Wakkanai station commander, Maj. "Dad" Purdum, near the harbor of the outpost is a symbol of vigilance.

toothpaste isn't so bad, but have you ever tried to brush your teeth with shaving cream?"

Wakkanai winter is the toughest on mess hall boss Sergeant Tippton and his right-hand man, A/2C Fred Clark. The watchmen never miss the chow call, no matter how deep the snow outside. And, as Clark says, "A hungry GI is worse than the Hokkaido bear." So, Clark marshals his Japanese cooks and helpers to fill every sink, can, and dish with water for use in cooking and dishwashing.

"It's a headache, but we've never missed the chow schedule," says Clark. "Of course, when the power fails we can't use our 'reefers' (walk-in refrigerators) but it's plenty cold so the stuff keeps all right."

Clark ought to know the GI mess hall behavior pattern. His father was an Army mess sergeant. Of course, being a GI himself, Clark gripes, too.

"I can hardly wait to get the hell out of here—go home to California," he says. And in the same breath, he adds, "On second thought, I'll probably wind up reenlisting in Japan. I know I'll miss this God-forsaken place —a swell bunch of guys."

The only spot at the Wakkanai Air Station where there's no water shortage or power failure is the hill. Water is no problem because the crews do not have any. If they want a drink, they merely melt snow.

The power on the hill never fails because of the unbeatable combination of three diesel generators and the "Quiet Man," as the men call S/Sgt. Robert Booth. In a separate dugout near the control bunker, Booth pets his diesels until they purr without missing a beat. Keeping them shipshape is no mean task. The diesels breathe through louvered intakes on top of the dugout, which must stay open lest the engines suffocate and quit. So, when a blizzard starts ramming the snow into the louvers, Booth and his helpers arm themselves with shovels and fight the snow for sometimes hours at a stretch.

But Booth only shrugs at praise. "The radar's got to go on," he says quietly. "I'm just doing my job."

This "just doing my job" is the standard answer at Wakkanai. You get it from the green GIs just off the train and from the "repeaters"—the oldtimers bitten by the Wakkanai bug who sign up for another tour. The top oldtimer among the watchmen is one of the youngest men there—the twenty-three-year-old M/Sgt. William "Sid" Sidwell, in charge of radio maintenance.

When the watchmen got sick of listening to the Kremlin radio propaganda—the only stuff their sets could get—Sidwell and a couple of other "static chasers" built their own broadcasting station, the WAKK. Now rock-and-roll platters drown out the *Ochy Tshornye* from Vladivostok. A bulb burned out? A mess hall "reefer" on the blink? Sid always hears about it and always finds time to fix it.

One night during a rainstorm Sid got an emergency call. One of the 3,300-volt line poles in the camp was on fire. Sid grabbed his pole-climbing gear, corralled Bob Marshall, his helper, and raced for the trouble spot.

Sure enough, the creosoted crossarm supporting the wire insulators was crackling like a bomb fuse. One high-tension wire was already drooping and within minutes there would be dangerous fireworks that could wreck the camp's electricity supply.

Leaving Marshall below to stand by, Sidwell climbed aloft. Perched between the two hot lines, Sidwell put out the fire. Swaying in the gale, he reached for the wire to refasten it. A gust of wind whipped the 3,300-volt line against Sidwell's thigh. There was a flash.

"I thought he got it," says A/1C Marshall. "He let out a hell of a scream and slumped in his safety belt. I started to climb to get him off, but before I was halfway up, Sid came to. He was still moaning, but he told me to stay down."

Looking back on his high-wire act, Sidwell crinkles his baby blue eyes. "Hell, I was up there already," he says. "Why should Marshall stick his neck out, too."

Sid finished the job as he always does. He still sports a scar above his knee. Had the wire touched him several inches higher he would have been a goner.

Sidwell's main responsibility is the radio relay stations—the lifeline of the Wakkanai outfit. Usually, when one of the radio sets goes off, the stand-by set takes over. But last spring, a one-in-a-million chance put the stand-by gear out of commission, too. There was no way of repairing the sets—they had to be replaced.

Putting an order through the supply channels would have meant weeks off the air, so Sidwell decided to pick up the new sets himself. With two spare tires on his six-by truck, he took off for the depot 260 miles away.

Nineteen hours and two flats later, he made it. He helped load the seven tons of equipment, and that same evening he began retracing his tire tracks to Wakkanai.

The heavily loaded six-by was harder on the tires—four of them blew out. The overworked hydraulic jack gave up the ghost.

"But I was lucky," Sidwell says. "The outside tires still held so I drove on—the hell with the inside flats."

However, Sidwell began to wonder about his luck when he stopped at the flood-swollen Teshio River. Crossing the river on the way to the depot had not been bad. The truck had been light enough for the hand-operated ferry boat. Now, the laden six-by would make the wooden ferry 9,000 pounds overweight.

Sidwell rooted out the old Japanese ferry operator. "Papa-San, we've got to get across. Think we can make it?"

Papa-San looked over the squatting truck and shrugged. "*Dai-jobe*—we try."

The crossing, Sidwell recalls, was a submarine operation. Hauling on the ferry's rope, Sidwell and Papa-San stood waist deep in the swirling current. The boat creaked and lurched, but made it across.

Another watchman who is held in high esteem is the "Doc"—A/1C William E. Porter. His doctorate is purely honorary; he is a medical technician. But he is trained to take care of any ailment from trenchfoot to appendicitis. And since Wakkanai has no MD, Porter rates high among the men.

Porter has an honest-to-suture surgery—scalpels, drugs, the works. He holds regular sick calls and like any conscientious GP, he's always on the end of a phone after his office hours.

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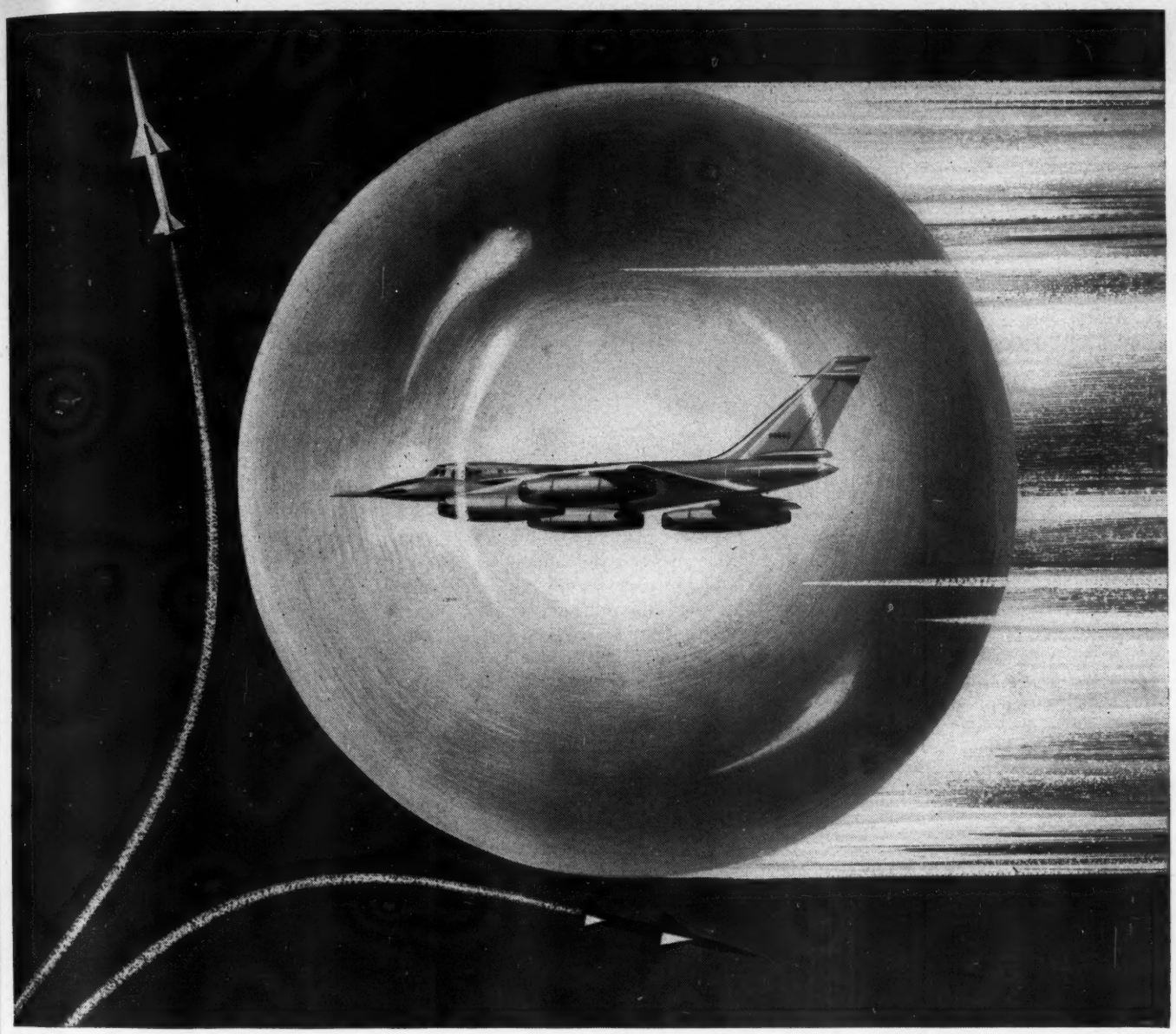

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Russian pilot's view of Wakkanai. At lower right, camp, upper left, the radar.

One night he was dragged out of his sack to attend a delirious airman. Porter unpacked his bag and examined the fellow.

"I'm always wary of malingering," he says. "Some guys like to take advantage of me, but that kid had real McCoy pneumonia—high fever and high pulse rate—everything like in my medical book."

Porter gave his patient an alcohol bath, a shot of penicillin, and called the nearest MD, then at Chitose Air Base. The doctor confirmed the diagnosis and told Porter to keep the man at Wakkanai. And after three days of Porter's care, the patient was good as new.

Another time Lefty Frizzell got banged up in an automobile crash. Porter taped Lefty's broken ribs, put his broken arm in splints, sutured the gash on his forehead, and fed him codeine. Since Wakkanai has no X-ray, Porter shipped the doped-up Lefty to Chitose base hospital, where he recovered nicely.

The man who by popular opinion (and Porter's medical book) should get a case of ulcers is Maj. James S. Purdum—the Wakkanai station commander. Running what he calls a housekeeping detachment, Purdum is the camp's Mess Officer, Postal Officer, Special Services Officer, PX Officer, Installations Officer, Provost Marshal, and the Motor Pool Officer rolled into one.

"I am like the tail trying to wag the dog," he says in his West Virginia drawl. "I guess even Houdini would be stumped by some of my problems."

A former horse artillery officer, Purdum is every inch a regular soldier—rough, tough, and regulations. Yet, behind his ramrod back the men call him Dad.

If one of his men gets in trouble in Wakkanai town, Purdum dons his civvies and goes to see the mayor or the chief of police. He gets no cramps from sitting cross-legged, and he can hold his *sake*—assets highly esteemed by the Japanese. He speaks enough Japanese to assuage the officials and get his man off the hook.

During a typical day, Purdum survives mostly on coffee. You see him supervise the mess hall extension, the new airmen's club project, snowplowing, the camp's ancient plumbing, planning lawns, booking movies, checking the camp's laundry, and haggling on the phone with higher headquarters over the shortages—his biggest headache.

One day Purdum got word that the American consul was arriving by train for a visit. "All my jeeps and weapons carriers were on the job," says Purdum. "The Japanese taxi was busy, too, and I was in a fix."

With only minutes to get to the station, Purdum pulled one of his famous improvisations. He took the only vehicle available and probably made diplomatic history. The consul rode to the camp in a garbage truck.

Of course, the men still gripe—what GI does not? But they appreciate "Dad's" efforts to make Wakkanai livable, which is a far cry from what the camp used to be in pre-Purdum days. Before Purdum took over the radar detachment's CO struggled with all the housekeeping problems. And holding so many jobs besides keeping the radar watch was enough to make anybody slip his blip.

A part of the Wakkanai legend is a story of the early CO who bought himself a horse, a ten-gallon hat, and a pair of six guns. His men called themselves Wakkanai Rangers and actually ran the camp in the Old West style. When the higher brass learned about it, they sent a tough master sergeant to the camp to whip up some discipline.

Of course, the "Rangers" didn't go for that. They held a meeting and decided to string the top stud from a mess hall rafter. The CO's western blood boiled. He galloped to the scene and with his shooting irons cocked, rescued the sergeant.

Purdum, of course, heard the legend. An avid horse lover himself, he would like to have a mount of his own. But as he says, "I'm going to keep walking—I don't want anybody to jump to conclusions."

As you leave the Wakkanai Air Station, you see a small, white building by the fence. That's the chapel. The men put it up themselves in six weeks of their spare time.

During the dedication ceremony, Protestant, Catholic, and Jewish watchmen listened to the rites and the speeches in perfect harmony. The visiting Protestant chaplain and Father Peter Takamia from the Roman Catholic Wakkanai parish consecrated the chapel. There were only three men of the Jewish faith—two airmen and Alex Berger, a Philco technical representative. So, Alex—an Orthodox Jew—donned his skull cap and chanted in Hebrew before the tough Wakkanai congregation.

And Dad Purdum gave a brief speech. "The thing that makes us men is the spiritual life," he said. "This chapel is the symbol of it and of what we stand for."

The watchmen have a succinct GI term for those who are about to go home. It is "figmo," which in polite, free translation means, "Farewell, I've got my orders." But those who are figmo hate to leave, for the rugged Wakkanai duty holds a magnetic challenge.

Bill Minton, the twenty-year-old radar crew chief, puts it this way, "If the shooting ever started, we'd have ninety seconds to live. But it's a damned good feeling to know that as long as we're doing a job here, the shooting may never start."—END

ABOUT THE AUTHOR

Michael Gladych, who contributed this piece, is a veteran of flying service in the air forces of three nations—Poland, France, and the US. An aeronautical consultant and member of the Institute of the Aeronautical Sciences, he has been a free lancer on aviation and airpower for several years since, as he puts it: "I'm too old to be a jet-jockey in the air but I try to do the next best thing—write about the USAF and airpower." Holder of a pilot's license, he has logged over 7,000 hours in military and private aircraft, including time in jet craft.

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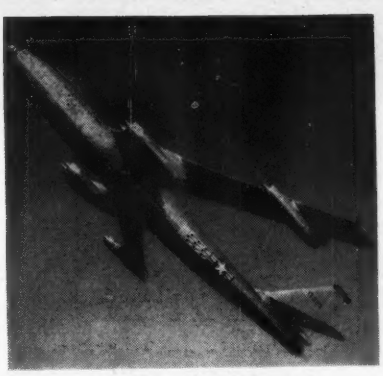

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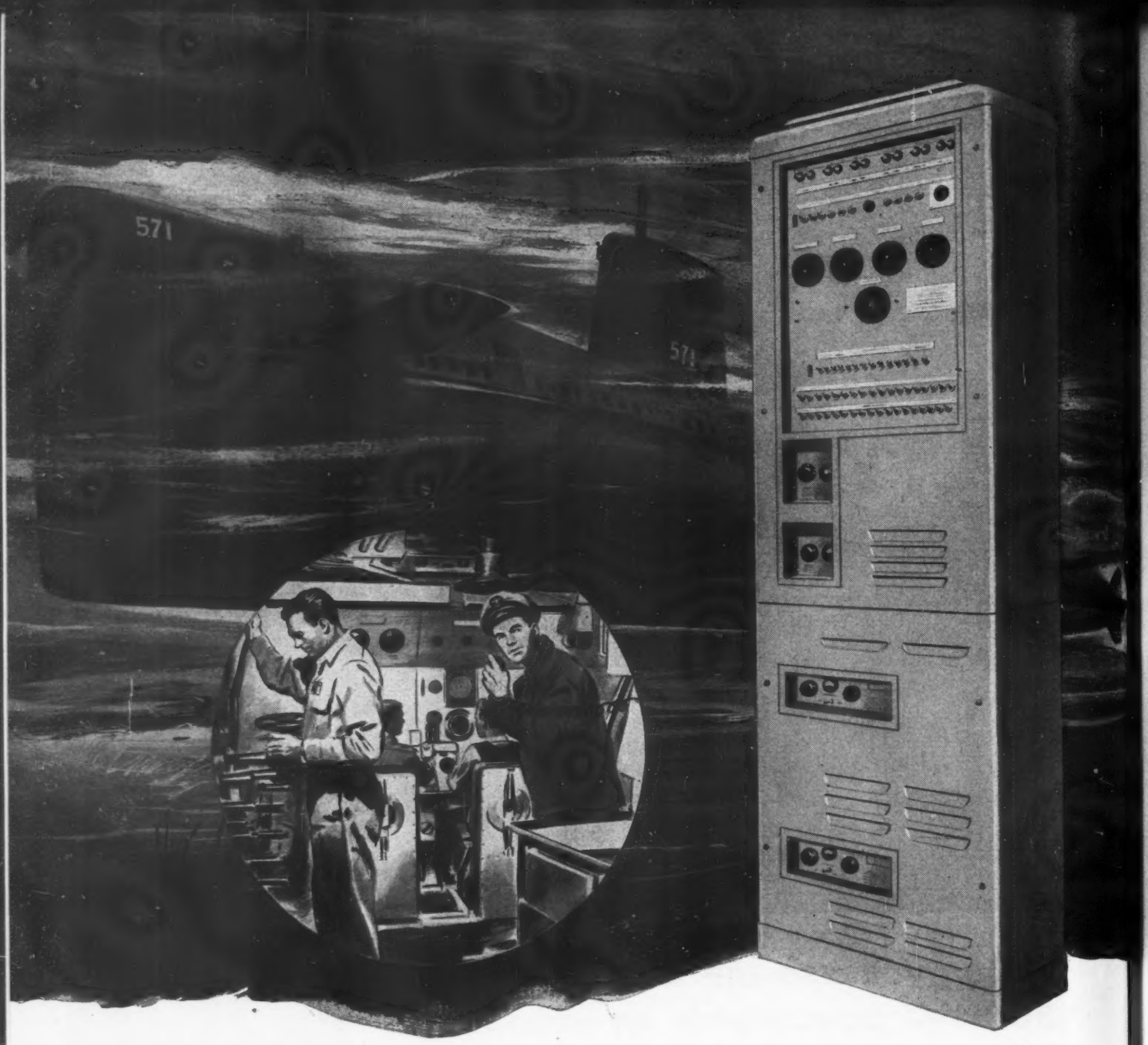

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By Robert W. Duncan

I Flew Through Hell for LOVE

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AREN'T you going to kiss me goodby, even though you are going to divorce me because I signed for another hitch and volunteered to test the Super-Swordfish B-301?" he asked, avoiding her gaze. Out on the lawn his five children were tumbling on the grass with his three dogs, two boxers and a schnauzer.

"I will," she said impassively, handing him his briefcase (the last time?), "if you'll take off your oxygen mask."

"Sorry," he muttered. "Darling—won't you change your mind? Think of the good times we've had together. Remember those nights on Miami Beach? Those days at Malibu? Those mornings in Maine?"

"How about that year in Adak?"

"But I sent you my whole pay."

"Who can live on $950 a month?"

"Don't forget the children, darling. And the dogs. I love you. Don't forget that. . . ."

"You only love me because I look like June Allyson," she whispered bitterly. "If you'd only listen to reason. Father will take you into his business as a partner. You know that."

He looked out the window again, his eyes tense and worn behind his goggles.

"You don't understand," he said softly, to himself. "I have to prove something to myself."

"But what? What?" she cried, pounding him on the parachute harness with her tiny fists. He stood, solid as a rock, and slowly pulled her arms down, holding her wrists.

"The car is waiting, dear. Since you refused to drive me to the field."

She threw herself on the sectional sofa, crying bitterly. He lifted his hand to her in a gesture he knew was futile. Slowly he turned and walked out into the blaze of noon. The trees, the ten acres of grass, the swimming pool, the two Jaguars. Life suddenly seemed rich and full to him. He shrugged, and stepped into the station wagon.

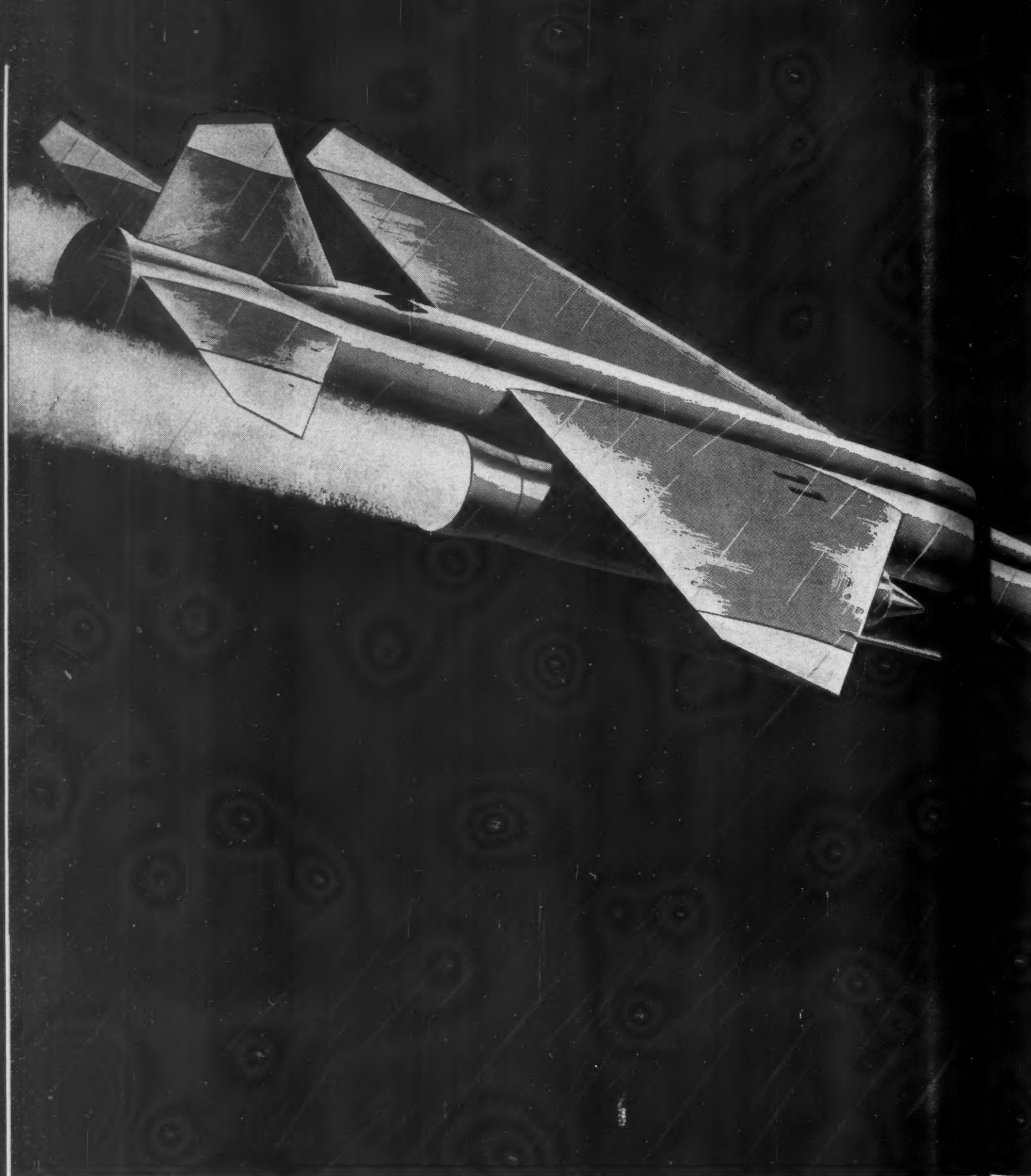
"Afternoon, Major," the driver said, with a deference to more than mere rank. The Major was the best there was.

He sat in the rear, his arms folded, as they glided through the suburbs and into the open desert country. All too soon they arrived at the Base. They stopped in front of Operations, and the Major strode into the General's office.

The General always made him feel like a little boy. Lean, hard, the veteran of innumerable missions and test flights, the General, the Major knew, would never ask him to do anything he wouldn't do himself.

"I wouldn't ask you to do anything

(Continued on page 63)



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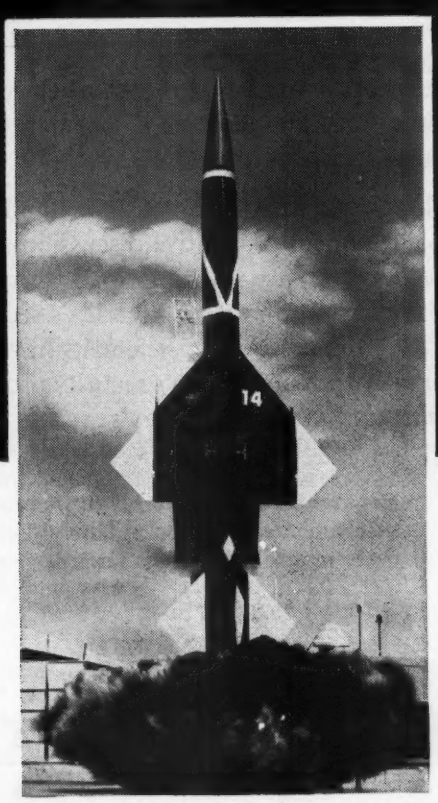
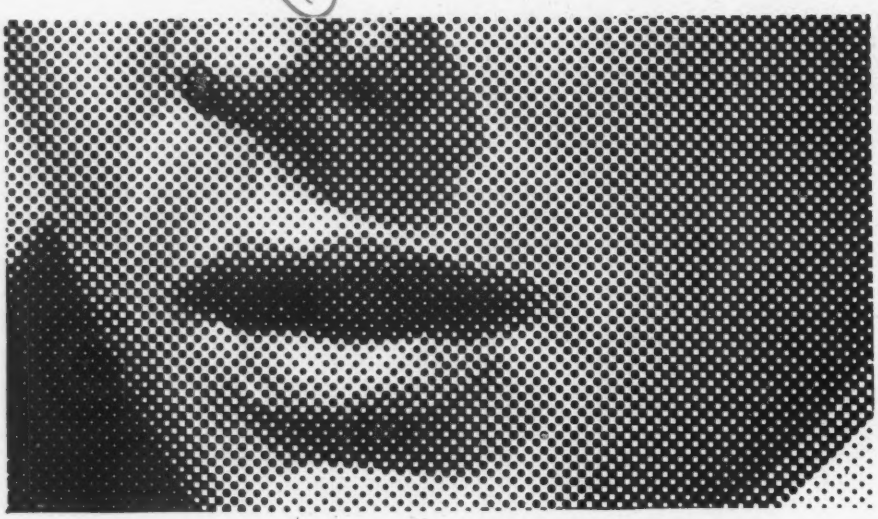


IM-99 BOMARC, long range, interceptor missile, designed and built by Boeing Airplane Company.



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I wouldn't do myself," the General opened. "You know that, Bill."

"Yes, sir," the Major said, looking at the General's decorations. He wore them on a cross-chest sash.

"You don't know what this test flight is, do you?"

"No, sir."

"I didn't dare tell anybody, or I couldn't have gotten a volunteer. Why *did* you volunteer, Bill?"

"I've got to prove something to myself, General." The howl of a low formation of F-403s came through the window.

"This is it, lad. The last crucial test of the B-301. We've saved the toughest for the last."

The Major blanched. The other tests had been hair-raising enough. The Super-Swordfish had gone through everything, including the underwater landing on the atomic submarine, which the General himself had made, almost losing his life in the most horrible fashion when he came face-to-face, tooth-to-tooth, with a school of cannibal fish. The General's hair had turned white during the experience, and he had called it his closest shave since the time a Pogo he was landing had an engine failure two hundred feet off the ground. His name had been Shorty since that one.

And the toughest was yet to come!

"All right, General. Let me have it."

The General walked to the window, his hands clasped behind.

"We know," he said, "what a pilot in good condition can take. We know how many Gs, how much altitude. But what about the tired pilot, a pilot full of the poisons of fatigue?"

"Yes?" said the Major, toying nervously with the pressure-suit intake tube.

The General spun around, overshooting slightly. He spun back and focused on the Major.

"What can a pilot take after flying around the world?"

Bill gulped.

"After flying around the world, you are to dive from 100,000 feet, pull out at Mach three, and then land."

"In that order?"

"In that order. If there is anybody in the outfit who can do it, you can." He put his hand on Bill's shoulder.

A mech appeared in the doorway. "The plane is ready, sir," he said.

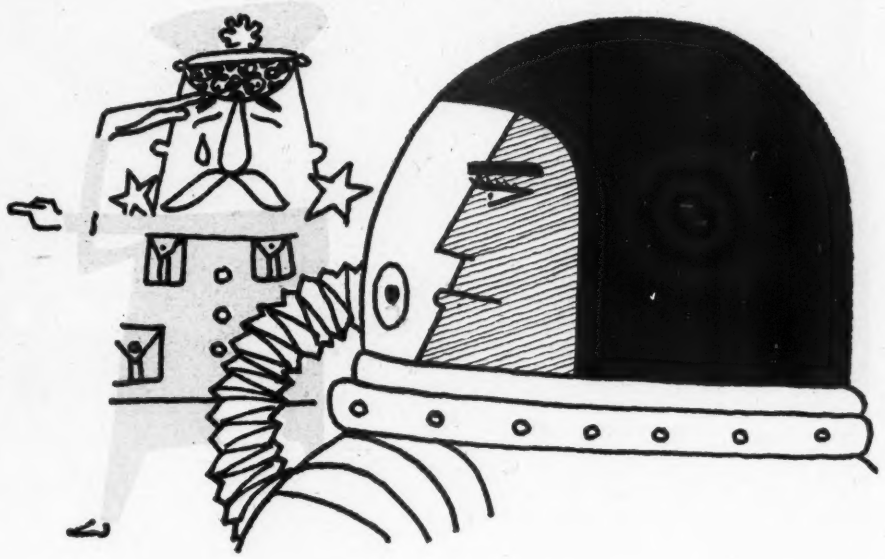
"One more thing," the General said.

"Yes?"

"We don't want you to have too much fuel in your tanks when you return for the dive, better dog-leg it by way of Little America."

"Will do," the Major replied, saluting. The General answered the salute slowly, sadly. Tears came into his eyes as he thought of his son. Tears of shame, as well as regret. Bill, in a way, had become like his own son, since Marvin had walked out of his life and joined the Navy.

Pentagon brass stood in front of Operations as the slim, vicious-looking B-301 started up, its fourteen engines



screaming a dervish tune as they blasted the desert sands into a great gray cloud. The Generals did not notice a couple—a distinguished gentleman in a gray flannel suit and a tiny wisp of a girl who looked like June Allyson—standing in the shadow of the control tower.

"We're too late, Dad," she said. "And I didn't even say goodby to him." She sobbed into his lapel as the B-301 slithered down the taxi-strip.

"Where are the wings, General?" a General asked.

"They're there, General," replied the General. "Watch when we get the tail view."

The B-301 rocketed out on the runway.

"Tower from 4591," the Major called. "Ready to roll."

"We do not have your clearance yet," said the tower operator, a callow youth with peach-fuzz on his lip.

"There isn't any," the Major bit out impatiently. "I didn't file any flight plan because I'm going to land here. It's a local hop," he added, chuckling mirthlessly to himself.

"Roger," the youth replied. "Cleared for takeoff!"

The B-301 screamed into the air swiftly and irrevocably, reducing the property value of local estates. In seconds it disappeared.

Up, up, he climbed, through the stratosphere, the ionosphere, the exosphere, until the world was a tiny sphere below him. He leveled at 100,000 feet. After flying for several minutes he felt weak. A twist of the dial, and the comforting hiss of the precious gas brought comfort. He gazed over his shoulder at the setting sun, in the east. Yes, the sun which was rising for the unseen men and women below him.

Two hours later, at Melbourne, he made his radio check on the special frequency set up for this flight.

"On schedule," he said. "Fuel okay. What is the weather in Calcutta?"

"Stand by," Melbourne answered. Then a moment later: "We have a special message for you from your wife."

His heart picked up a beat.

"Roger," he said. "I mean Romeo. What is it?"

"It is a boy," the Melbourne operator read. "Nine pounds. Both doing fine. Signed, Dad."

The little doll! And she hadn't told him. A tear came into his eye, a spot of moisture unseen by the wild bushmen who roamed the desolate areas of central Australia forty miles below him. She was always pulling these little surprises. Like the B-36 she bought last month and had assembled in the back yard for a birthday present.

The nations of the world slid below his wing one by one as the minutes ticked on. He tried not to think of the final maneuver—the pullout at Mach three. It was too cruel, too unnerving. But during that dive and recovery he might find out what he

(Continued on following page)

wanted to know, prove what had to be proved. And if he did, he could turn on his heels and walk away from the best plane they could offer him, secure, untempted. It would be Jeune, the boxers, the schnauzer, and the five kids, from then on. No, six. That little doll!

As the US coast came into view, he gave his safety straps another hitch. Mach three! He shook his head, as if to shake off the fatigue which was grabbing at his eyes with gloves of steel wool. His mouth felt like cotton; the martinis in the thermos had been too dry.

The thin thread of the Mississippi. Ten more minutes, and then the mad dive to earth. Why? His tired brain kept asking. Why? To find out what a man can take when he's tired?

I'll tell you what he can take. He can take a long rest. A month of afternoons on the beach, baking in the sun. The arms of a loving wife, and the distant clatter of children. A little boy, too! He smiled with unabashed sentiment, as he rubbed the stubble on his chin.

"Should have shaved before I left," he muttered as he plugged the razor into the panel receptacle. "Ought to have a clean face for the newsreels. Or," he added, laughing sardonically, "the surgeon."

"We have you on radar," the Base called. "Congratulations on a great trip. Begin to dive in two minutes, heading two-eight-zero."

The Major checked his fuel. Just right, if he landed on the first pass. He turned slightly left, to the heading.

Then gently, as gently as the breeze detaches a rose petal, he pushed the stick forward, trimming to match. Mach two was old stuff, but as he approached Mach three it set in, the triple paradiddle buffet which was the terror of those who flew the silver bullets. He felt his teeth rattle as he marveled that a machine could hold together at this pace.

His watery eyes searched the blur of the panel for the speed indicator. He found it at last, and examined it with the wobbly care of a drunk trying to focus. It couldn't be! Mach four!

He pulled back, gently, gently. The buffet eased to a double, but the altimeter kept winding down. Fifty thousand, forty-five, forty.

"Pull out!" the General's voice screamed at him. "Pull out!"

"I can't!" he ground out from clenched teeth. Perspiration and tears of pain were filling his goggles, and he could not take the time, with precious milliseconds left, to start the pumps.

"Then eject! Pull the seat ejector!"

The Major's left hand found the lever, and pulled. A blast.

"Did you pull the seat ejector?" the General called.

"Yes," answered the Major.

"What's the matter with it?"

"Works fine," the Major said. "Ejected the seat. I'm still in the plane."

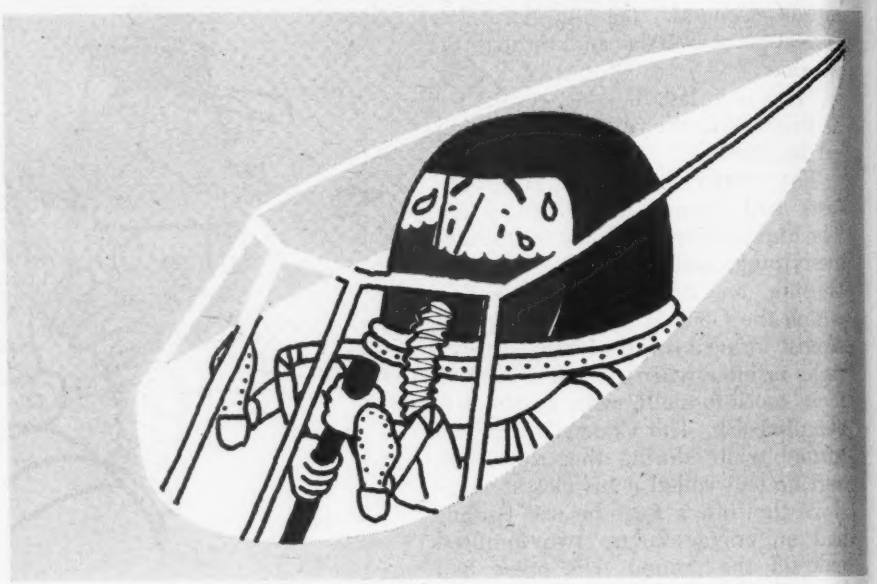
Those on the ground saw it approach, a tiny point which grew rapidly into a silver streak. It was in level flight, hurtling over the desert a hundred feet in the air. Before their eyes it settled slowly into the sand and slithered to a smooth stop, leaving behind a red trail of molten metal and sand.

When the ambulance copter landed in front of Operations, the Major had recovered sufficiently to step out without help. Waving the doctor aside, he strode toward two people his sharp vision had detected standing near the door. One, a little wisp of a girl with a husky voice, was holding a baby. The other was her father.

"Darling," she said, "it was horrible! I didn't think I'd ever see you again."

"Just a job somebody had to do," the Major said tersely. The General stood proudly ten feet behind him. "And I had to prove something to myself."

"Did you do it?" she asked breathlessly. "What was it?"



"I had to find out," he said. "And now that I have, General," he added, turning, "I am submitting my resignation."

"What did you find out?" Jeune's father asked.

"That I'm a coward. Darling!" he smiled, turning his back on the crestfallen General and holding out his arms, "How about that partnership?"

And they strolled into the sun, setting in the west as all suns should, the two of them arm in arm, Bill and his father-in-law, Jeune and her precious bundle from Heaven fetched up the rear.

"Wait till he finds out the schnauzer has worms!" she snickered to herself. "And there's a dead rat in the swimming pool."—END

ABOUT THE AUTHOR

Robert W. Duncan, now an assistant professor of English at the Alton Residence Center of Southern Illinois University, has contributed articles to such publications as Real, True, *and the old* Bluebook, *as well as* Air Facts, *for which he started writing back in 1943. During World War II, he served in the US Navy as an instrument instructor with the rank of lieutenant (jg), and since then his reserve activity has included tours as commanding officer of Naval Reserve fighter squadrons in Columbus, Ohio, Crosse Isle, Mich., and Olathe, Kan., with the rank of lieutenant commander. He joined the faculty of Southern Illinois in September, and now lives at Alton, Ill., just a few minutes from the campus of the university.*

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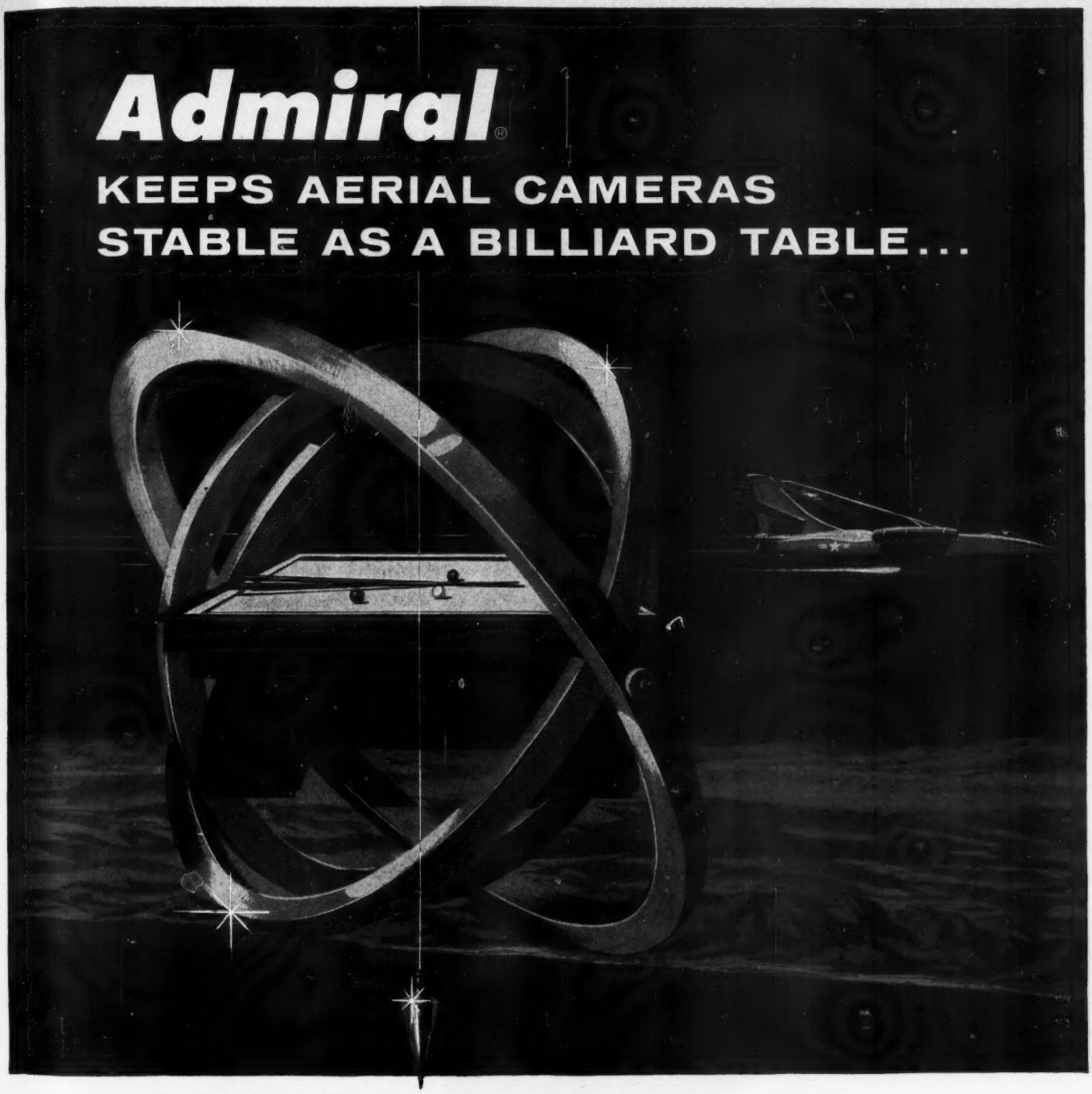

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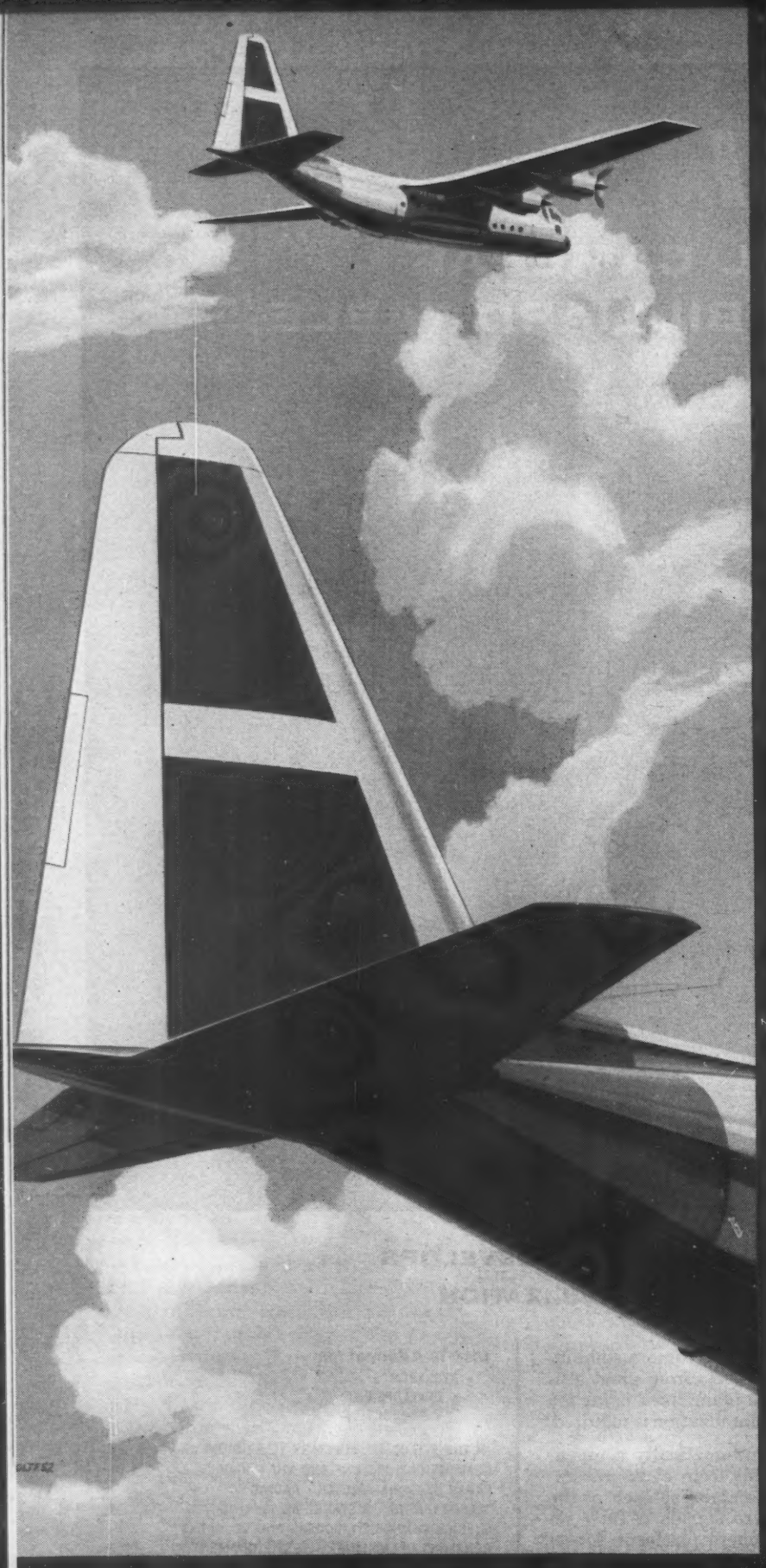

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And There Might Be More . . .

Reserve and Guard Wings Axed To 39

By Edmund F. Hogan
RESERVE AFFAIRS EDITOR

IT USED to be that new Air Force Reserve programs bloomed in the springtime—along with the dandelions. But this year the new one has emerged in the fall, well ahead of the traditional timetable.

Until last month the established flying wing program for the Air Force Reserve and Air National Guard totaled fifty-one, twenty-seven in the Guard and twenty-four in the Reserve. But last month the ax fell and the program was revised downward to thirty-nine wings, twenty-four in the Guard and fifteen in the Reserve.

The cuts reflected the continuing reductions being applied to the Air Force as a whole, including deep slashes in vital research and development projects, and were dictated by expenditure ceilings applied by the Administration to the Reserve and Guard.

Although the Guard received an appropriation from Congress for the current fiscal year of $263 million, the Administration told the Air Guard it could spend only $233 million. To live within this expenditure ceiling, three ANG wing headquarters were lopped off, along with three squadrons.

To support the Air Force Reserve program of twenty-four flying wings, approximately $100 million was required in maintenance and operation funds. The Administration told the Air Force it could have $81 million in this area. As a result, nine wing headquarters and ten squadrons were eliminated.

The new lineup sets up distinct missions for the two components. The Guard will be a combination of fighter and tactical reconnaissance—almost 100 percent jet equipped—while the Reserve will be composed exclusively of troop-carrier units.

The Guard knocked out a wing headquarters and one fighter-interceptor squadron at Floyd Bennett Naval Air Station in Brooklyn; a wing headquarters in Connecticut and another in Philadelphia; a fighter squadron at Reading, Pa., and a fighter squadron at O'Hare Field in Chicago. The Guard personnel losses will approximate 156 officers, 632 airmen, and 247 full-time technicians.

The Reserve eliminated wing headquarters at Floyd Bennett in New York, Minneapolis-St. Paul, Portland, Ore., Chicago, Pittsburgh, Scott Air Force Base, Niagara Falls, Memphis, and Dallas.

The ten Reserve squadrons eliminated were the 79th Troop-Carrier at Floyd Bennett; 328th at Wilmington, Del.; 757th at Richmond, Va.; 472d at Willow Run Airport, Mich.; 64th at Portland; 84th at Chicago; 56th at Pittsburgh; 732d at Scott; 813th at Dobbins Air Force Base, Ga.; and the 357th at Clinton County AFB, Ohio.

Along with the eliminations, the Air Force announced some reshuffling of units which will remain in the program. The 512th Troop-Carrier Wing, now located at Wilmington, Del., will be moved to Willow Grove Naval Air Station, N.J. With the wing will go its 326th and 327th Squadrons.

The 73d Troop-Carrier Squadron, now at Dress Memorial Airport, Ind., will be shifted to Scott Air Force Base. The 77th Troop-Carrier Squadron, now at Pinellas County Airport, Fla., will be moved to Alvin Callender Field at New Orleans. The 78th Troop-Carrier Squadron, now at Holman Field in the Twin Cities of Minneapolis-St. Paul, will be transferred to Billy Mitchell Field at Milwaukee.

The cuts will eliminate from the Reserve flying program approximately 1,100 officers, 3,000 airmen, and 400 civilian employees. While the reduction policy decreed that those made surplus by the cuts should be given all possible help in finding new assignments, it appears unlikely that they can be absorbed in any other portion of the paid Reserve program. Among those affected immediately are one brigadier general, thirty-two colonels, and eighty-three lieutenant colonels.

The reductions were not surprising in the light of the shrinking process currently going on within the active establishment. Some 3,000 Reserve officers on extended active duty are being—or will be—let out as the Air Force reduces from its current officer strength of 140,000 to 128,000 by next June 30. At that time the active Air Force will total 875,000 officers and airmen as contrasted to 922,000 now on board.

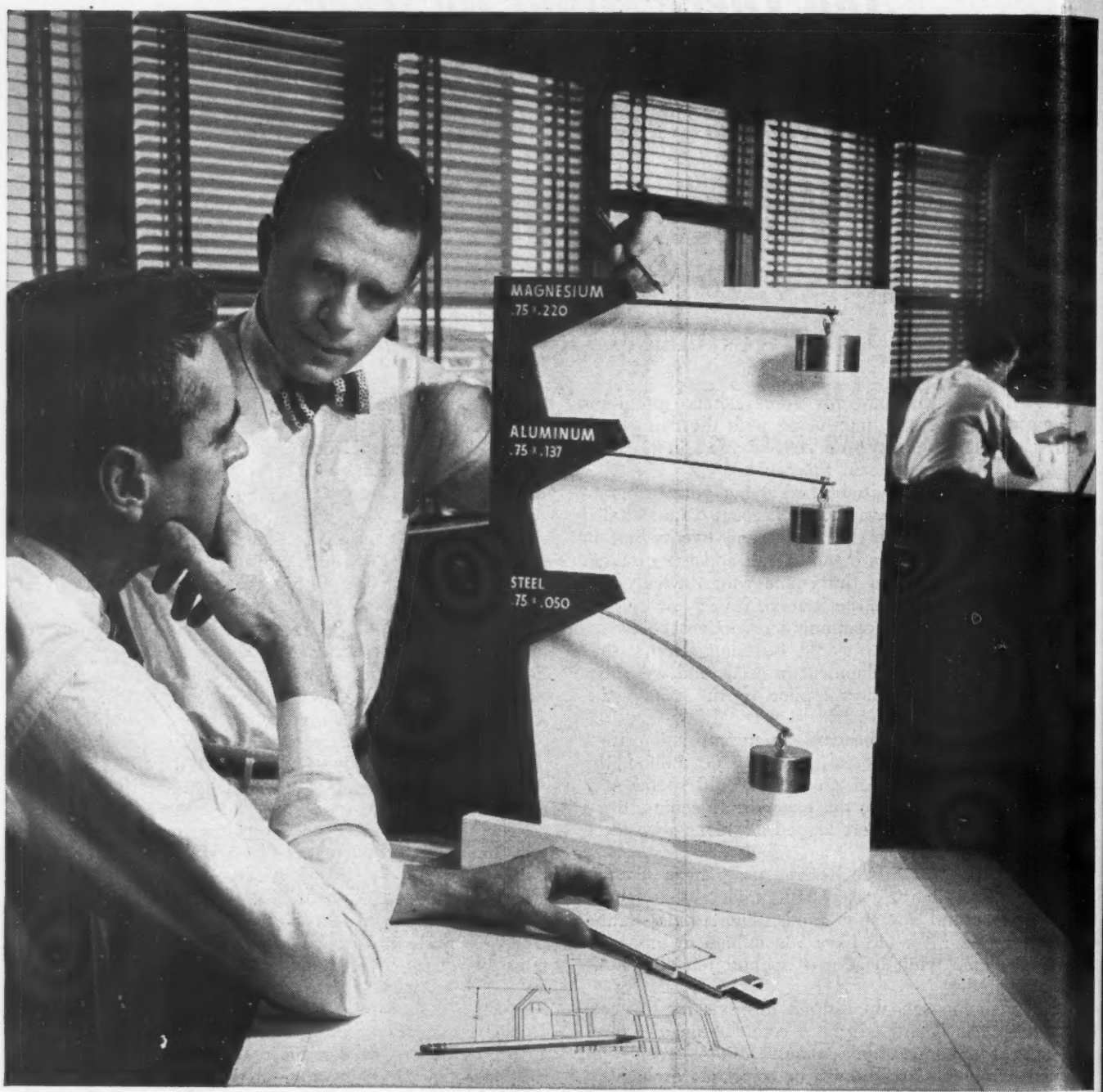
Even before the Air Force Association's convention in Washington last August, it was known that studies were in process looking to a reduced Reserve Forces structure, of a size that could be supported within the funds that the Administration would make available.

That the flying program would be axed immediately was a foregone conclusion because of the high cost of maintaining and operating aircraft. Dollars saved in this way can be stretched to provide instruction in the relatively inexpensive non-pay segment of the individual training program.

To keep alive retirement rights, it is assumed that Reservists and Guardsmen made surplus by the cutbacks will gravitate to the Air Reserve Centers. There are ninety-three of these currently operating in the country, offering specialized training, some of which is in pay status.

But despite the fact that Air Force has enough money to support the 165,000 Reservists and Guardsmen currently being paid, the center program is being looked at critically by both the Bureau of Budget and Department of Defense. A straw in the wind, perhaps, was Continental Air Command's order shutting down three nonflying activities—the personnel processing centers at Baltimore, Los Angeles, and Pittsburgh—at almost the same moment the Pentagon was announcing the cuts in the flying units.

(Continued on page 69)



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Continental Air Command, itself, is being examined closely and reports are current that it is due for a reduction in strength, with a possibility existing that it may lose one of its four numbered air forces.

A smaller CONAC appears imminent because, while the command has a variety of missions, including search and rescue responsibilities, its principal tasks are operating the Air Force Reserve and supervising Air Guard training. Fewer units will reduce requirements in these two areas.

Operationally, the cuts in both the active establishment and Reserve Forces programs may prove beneficial to the Air Guard. An immediate result of the cuts was to make available to the Guard about 100 late-model North American F-86H and F-86L jets which had been in the Reserve and active Air Force inventory. Also being made available from Tactical Air Command are sufficient numbers of RB-57s to equip four Guard squadrons for a bomb-damage assessment mission. And reductions in Air Defense Command will give the Guard an opportunity to take over more active Air Defense responsibilities.

One proposal being advanced, for example, would have the Guard deactivate its 183d Tactical Reconnaissance Squadron at Jackson, Miss., and reactivate the unit as a fighter-interceptor squadron at McGhee-Tyson Field in Tennessee, replacing an Air Defense unit there. If the proposal is carried out, the Guard will take over the entire installation and the Air Defense mission from the active unit.

Politically, the cuts have had the expected repercussions. Illinois, where the loss of one Guard fighter squadron at O'Hare will cause the 126th Fighter-Interceptor Wing to reorganize into an Air Defense Wing with the loss of seventy-five air technician positions, has protested strongly to the National Guard Bureau. A similar protest has been lodged by New York, where the loss of the 106th Fighter-Interceptor Wing Headquarters and 114th Fighter-Interceptor Squadron will cause a reshuffle of the units remaining into an Air Defense Group. Seventy-three air technician slots will be eliminated here, along with seventy-six officers and 201 airmen.

Reservists, likewise, have voiced their objections. In New York, where two Reserve wing headquarters and one troop-carrier squadron were eliminated, Reservists lost no time protesting to both of the state's US senators and representatives in the congressional districts affected. Texas and Minnesota representatives also heard from their constituents in the Dallas and Twin Cities areas.

There is little doubt that an investigation into the reserve programs of the Army and Navy, already scheduled for next January by Rep. Overton Brooks of the House Armed Services Committee will be expanded to include the Air Force Reserve reductions.

But this will be an investigation after the fact. For Continental Air Command and the National Guard Bureau have been instructed by the Air Force to get on with the inactivation in the Reserve and Guard—now.—END

HOW RESERVE FLYING WINGS LINE UP NOW

After all the cuts and switches had been made, here is how the fifteen Reserve flying wings lined up:

UNIT	LOCATION
94th T/C Wing	**Hanscom Field, Mass.**
731st T/C Squadron	Hanscom Field, Mass.
732d T/C Squadron	Grenier AFB, N. H.
302d T/C Wing	**Clinton Co. AFB, Ohio**
355th T/C Squadron	Clinton Co. AFB, Ohio
356th T/C Squadron	Clinton Co. AFB, Ohio
514th T/C Wing	**Mitchel AFB, N. Y.**
335th T/C Squadron	Mitchel AFB, N. Y.
336th T/C Squadron	Mitchel AFB, N. Y.
337th T/C Squadron	Bradley Field, Conn.
433d T/C Wing	**Brooks AFB, Tex.**
67th T/C Squadron	Brooks AFB, Tex.
68th T/C Squadron	Brooks AFB, Tex.
69th T/C Squadron	Dallas AFB, Tex.
442d T/C Wing	**Grandview AFB, Mo.**
303d T/C Squadron	Grandview AFB, Mo.
304th T/C Squadron	Grandview AFB, Mo.
305th T/C Squadron	Tinker AFB, Okla.
357th T/C Squadron	Davis Field, Okla.
452d T/C Wing	**Long Beach MAP, Calif.**
728th T/C Squadron	Long Beach MAP, Calif.
729th T/C Squadron	Long Beach MAP, Calif.
730th T/C Squadron	Long Beach MAP, Calif.
733d T/C Squadron	Hill AFB, Utah
446th T/C Wing	**Ellington AFB, Tex.**
328th T/C Squadron	Barksdale AFB, La.
704th T/C Squadron	Ellington AFB, Tex.
705th T/C Squadron	Ellington AFB, Tex.
706th T/C Squadron	Alvin Callender Field, La.

UNIT	LOCATION
403d T/C Wing	**Selfridge AFB, Mich.**
63d T/C Squadron	Selfridge AFB, Mich.
64th T/C Squadron	Niagara MAP, N. Y.
512th T/C Wing	**Willow Grove NAS, N. J.**
326th T/C Squadron	Willow Grove NAS, N. J.
327th T/C Squadron	Willow Grove NAS, N. J.
434th T/C Wing	**Bakalar AFB, Ind.**
71st T/C Squadron	Bakalar AFB, Ind.
72d T/C Squadron	Bakalar AFB, Ind.
73d T/C Squadron	Scott AFB, Ill.
435th T/C Wing	**Miami IAP, Fla.**
76th T/C Squadron	Miami IAP, Fla.
77th T/C Squadron	Bates Field, Ala.
459th T/C Wing	**Andrews AFB, Md.**
756th T/C Squadron	Andrews AFB, Md.
757th T/C Squadron	Youngstown MAP, Ohio
758th T/C Squadron	Greater Pittsburgh AP, Pa.
440th T/C Wing	**Billy Mitchell Field, Wis.**
95th T/C Squadron	Billy Mitchell Field, Wis.
96th T/C Squadron	Minn.-St. Paul IAP, Minn.
97th T/C Squadron	O'Hare IAP, Ill.
349th T/C Wing	**Hamilton AFB, Calif.**
312th T/C Squadron	Hamilton AFB, Calif.
313th T/C Squadron	Portland MAP, Ore.
314th T/C Squadron	McClellan AFB, Calif.
758th T/C Squadron	Paine AFB, Wash.
445th T/C Wing	**Dobbins AFB, Ga.**
700th T/C Squadron	Dobbins AFB, Ga.
701st T/C Squadron	Memphis MAP, Tenn.
702d T/C Squadron	Memphis MAP, Tenn.
65th T/C Squadron	Donaldson AFB, S. C.

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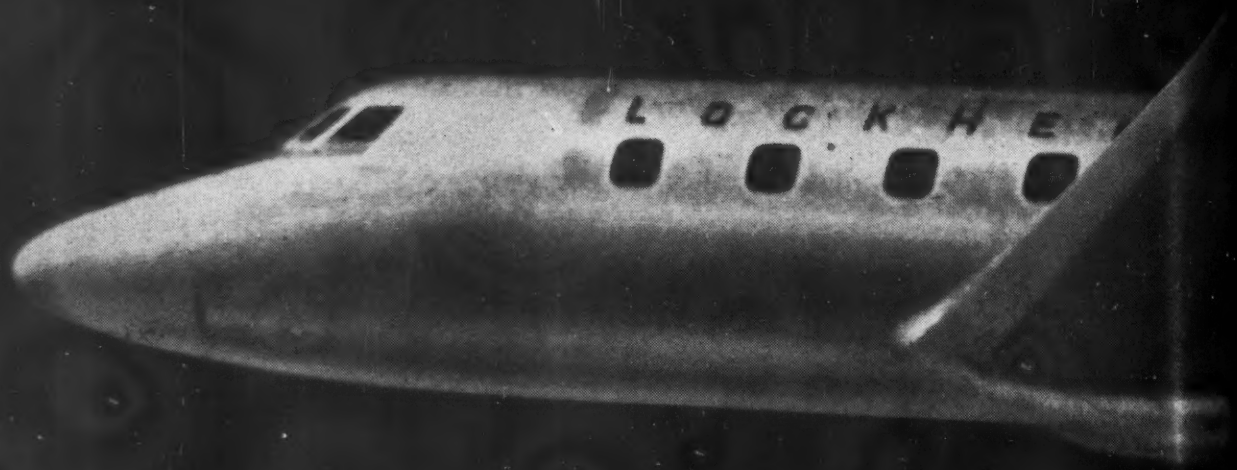
LOCKHEE

First flight of the JETSTAR (powered by two Bristol Orpheus engines with a total takeoff thrust of 10,000 pounds) was made September 4, at Edwards AFB. A second prototype, scheduled for flight early in 1958, will be powered by four General Electric J-85 or Fairchild J-83 engines.



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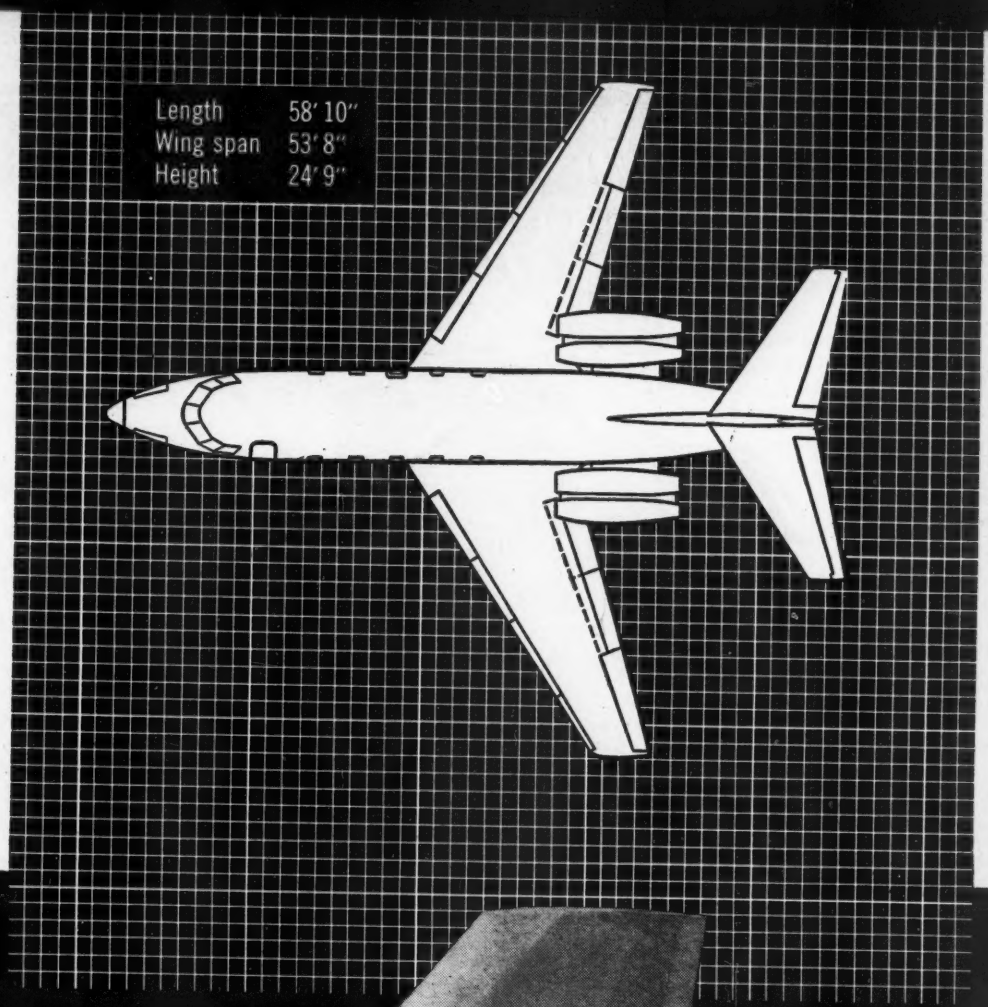

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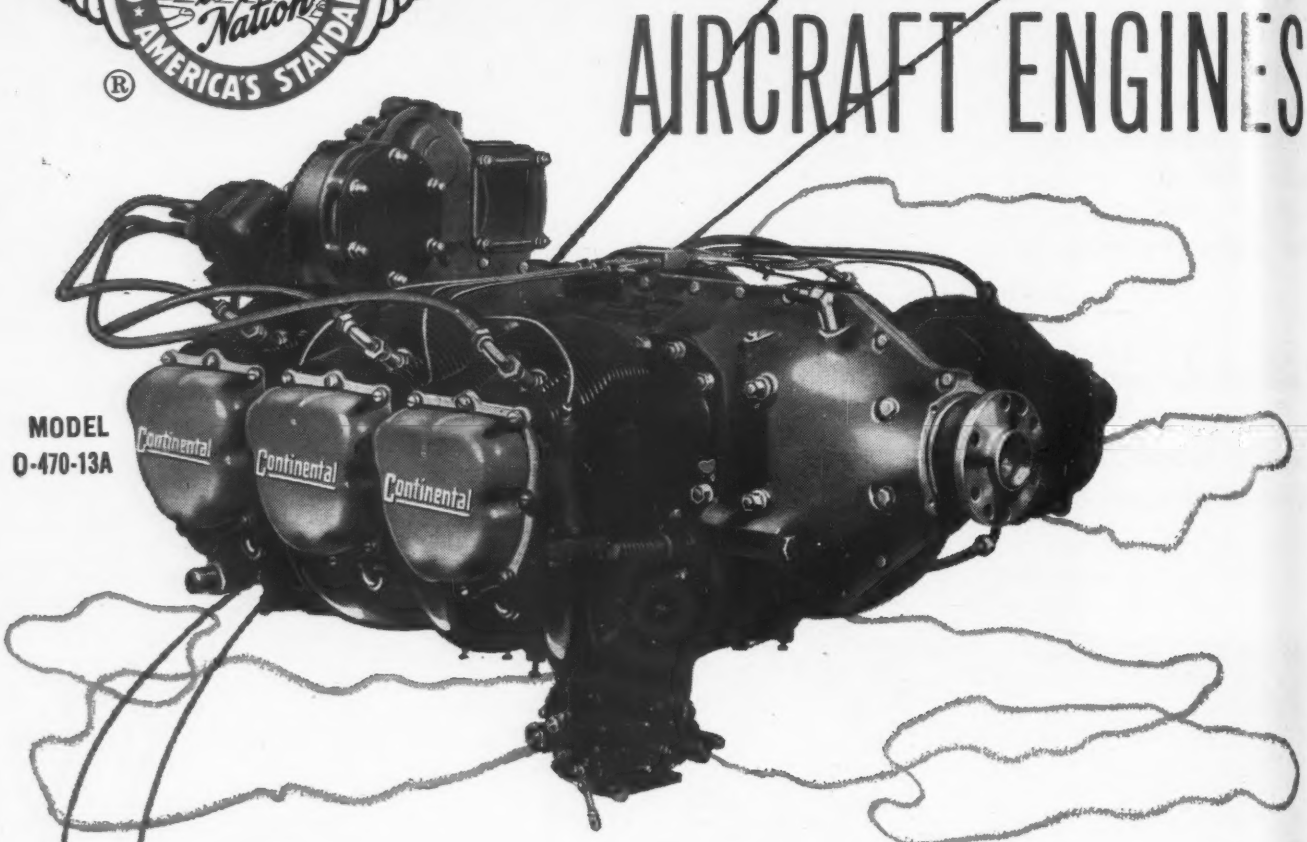

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E-225	225	2650	6	363	80
*O-470-4	225	2600	6	415	80/87
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The READY ROOM

RESERVE AND AIR GUARD NEWS

Twenty-four amendments to the Air Force section of the **Reserve Officers Personnel Act** are scheduled to be sent to Congress when the 85th Congress reconvenes after the first of the year.

The proposed changes stem from two sources: the Air Force itself and an *ad hoc* committee of Reservists and Guardsmen brought together a year ago under the chairmanship of Reserve **Brig. Gen. Frank T. McCoy** for the purpose of suggesting amendments that would make the law more workable.

The law provides for the promotion, precedence, constructive credit, distribution, and retention of Reserve officers. It became effective July 1, 1955, and has been a center of controversy ever since.

Recommendations of the **McCoy Committee** were staffed in the Air Force before they were moved to the **Reserve Forces Policy Board** in the Department of Defense, and ultimately, to Assistant Secretary of Defense for Manpower, Personnel and Reserve Forces, **William H. Francis, Jr.** Last month Mr. Francis okayed the twenty-four Air Force proposals and said they would go to the Congress under the auspices of the Defense Department.

Twenty-two of the twenty-four proposed amendments appear to be noncontroversial. These deal with such items as clarifying how to arrive at date of rank; permission of male nurses to participate in Reserve training which is now restricted to female nurses; provision of vacancies to which general officers on duty in the National Guard Bureau might return upon concluding a four-year tour in the Bureau; and protection of Civil Service retirement rights of Reserve officers who might some day be hired as Air Reserve technicians.

The two proposed amendments which are certain to create controversy are:

- Elimination of ROPA's **"pusher"** clause.
- Establishment of a system of temporary or "spot" promotions in the Guard and Reserve.

One section of ROPA says that officers must be considered for promotion so that they will be promoted, if qualified, at **specified phase points** in their career. In the case of a **major,** he must be considered for elevation to lieutenant colonel when he has completed **seven years** in grade and has a total of fourteen years of service.

Another section of the law, however, says that when this happens, **all** officers in the same category who are senior to those being considered **must also be considered** by the promotion boards.

There are literally thousands of officers who were promoted rapidly in the past, reached the rank they now hold, and have acquired much more time in grade than the law requires for promotion. As a result, their time in grade is out of proportion to their total years of service.

The net effect is that those who have all this time in grade are "pushing" the other group into promotion and, usually, since few occupy position vacancies calling for a higher grade, right out of the Reserve program.

The proposed amendment would provide that **only those who meet both the criteria** of promotion service and total service will be considered for mandatory retirement. But thousands of high-ranking officers who do not have the total service requirement to be eligible for promotion will be affected adversely.

Theoretically, under existing law, an officer could run the course from second lieutenant to colonel in thirteen years. By eliminating the "pusher" clause, the Air Force could control this promotion cycle so that it would take twenty-one years to cover the same distance.

Even **more controversial** is the proposed amendment to establish a system of **temporary** or "spot" promotions.

ROPA, like its counterpart for the Regular Air Force—the Officers Personnel Act—is a **permanent** promotion law.

The law specifically establishes the percentages of officers in the Reserve components who may occupy the various grades. An analysis of the percentages reveals that ROPA permits about one-half as many majors as it does captains; about one-third as many lieutenant colonels as majors; and about two-fifths as many colonels as lieutenant colonels.

This establishes a sharply-rising pyramid with insufficient spaces at each level for those who must be promoted mandatorily. The same situation does not exist in the Regular Air Force under the Officer Personnel Act. This act authorizes temporary promotions.

The proposed amendment to ROPA would do the same thing—authorize a "spot" promotion any time an officer satisfactorily fills a position vacancy calling for a higher grade. However, the proposed ROPA amendment dictates that any time the officer leaves the position calling for higher rank, **he must revert** to his permanent grade. The same situation does not apply in the Regular Air Force because officers holding temporary higher grades may be reassigned against worldwide vacancies in the temporary grade. No such procedure exists in the Reserve structure because the majority of Reserve officers are tied to a specific unit and geographical location by reason of civilian occupation.

The **Air National Guard,** in particular, is not kindly disposed toward the amendment because not only are Guard promotions traditionally permanent promotions, but the Guard is organized on a unit structure and an officer promoted to a higher position vacancy normally holds that slot until he is moved to another job calling for promotion.

Reservists who are aware of the proposed amendment appear to dislike its provisions because of the feature that requires an officer to drop back every time he loses out on the vacancy he is holding—even through **no fault of his own,** such as the ordered elimination of his unit or mobilization assignment.

A further reason for adverse reaction among Guardsmen and Reservists is the fact that the proposed amendment does not permit time spent in the "spot" promotion to count toward the next higher grade.

An example: A captain is made a squadron operations officer and is promoted to temporary major and serves in the position for two years. At the end of this time he has a total of fourteen years' service and is mandatorily promoted to permanent major. A day later he is assigned as squadron commander and is given a "spot" promotion to lieutenant colonel.

Under the proposed amendment, the time spent as a temporary major—two years—in the squadron operations job **does not count** as time in grade to lieutenant colonel.

Whether opposing views on the temporary promotion plan can be reconciled is questionable. But the fact is that promotion has become a serious problem. Last year, almost 27,000 officers were considered for promotion. Of this number, only 13,000 were selected. Some 11,000 were eliminated from the Reserve program and the balance were deferred.

—EDMUND F. HOGAN

Students at missile training school at Lowry AFB, Colo., test pulse generator, one of many units used in maintenance and preparation for launching.

AIR FORCE CAREERS

NO. 11 OF A SERIES

The Missile Technician

By Flint O. DuPre

MISSILES—today's newest air weapon system—are fast creating a brand new and expanding career field in the Air Force.

The claims and counterclaims by the USSR and the US in the race for the first effective intercontinental ballistic missile and the disclosure that we now have a missile-detecting radar with a 3,000-mile range underscore the importance of officers and men devoting their skills to missiles. This applies to the entire family of missiles in the Air Force armory, including such items as the Martin Matador, the Hughes Falcon, now assigned to operational units, and the Boeing Bomarc, now in production.

Called "Guided Missile Systems," this select career field is the 31000 series in the Air Force Specialty Code. Compared with other fields, its subdivisions are meager now, but increasing every day. At last count, there were only seven job specialties under the Guidance and Control Systems Superintendent. They are Guidance Systems Technician and Mechanic, Control Systems Technician and Mechanic, Instrumentation Technician and Mechanic, and Guidance and Control Systems Helper.

Functions in the Guidance Systems area include the assembly, installation, maintenance, checkout, and repair of guided missiles, and of guided aircraft, rockets, and instrumentation equipment. Some missilemen have responsibility for the operation and maintenance of pilotless target aircraft, like those used by the combat commands—SAC, TAC, and ADC—in bombing, fighter-interceptor, and navigation and reconnaissance competition.

Learning the field, airmen study all aspects of the equipment that guides missile flight, including radar and infrared seekers, loran-type systems,

(Continued on page 77)

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ASW* is a Navy need in protecting our nation's supply lines . . . as guardian of our coast line . . . if the time ever comes when an underwater aggressor wants to pose his threat. Like Jove, god of the skies, the Navy's *Anti-Submarine Warfare techniques will be poised to seek and sink that threat . . . with a complete electronic search, track and kill package especially designed for the aircraft and the mission. ➢ ➢ For economical and operational efficiency, the LMEE "Tri-A" (Advanced Airborne ASW*) system will fill a true Jove-like function . . . in seeking the aggressor . . . and as a thunderbolt in destroying it. ➢ ➢ This is only one of many LMEE advancements in sonobuoys, displays and search systems. Along with the development and production sections in Utica, its Advanced Electronics Center at Ithaca, New York, is making important contributions to passive systems studies. Coordination between LMEE engineers and Naval research scientists can wipe out tactical advantages the submarine has traditionally enjoyed. Write Department A.

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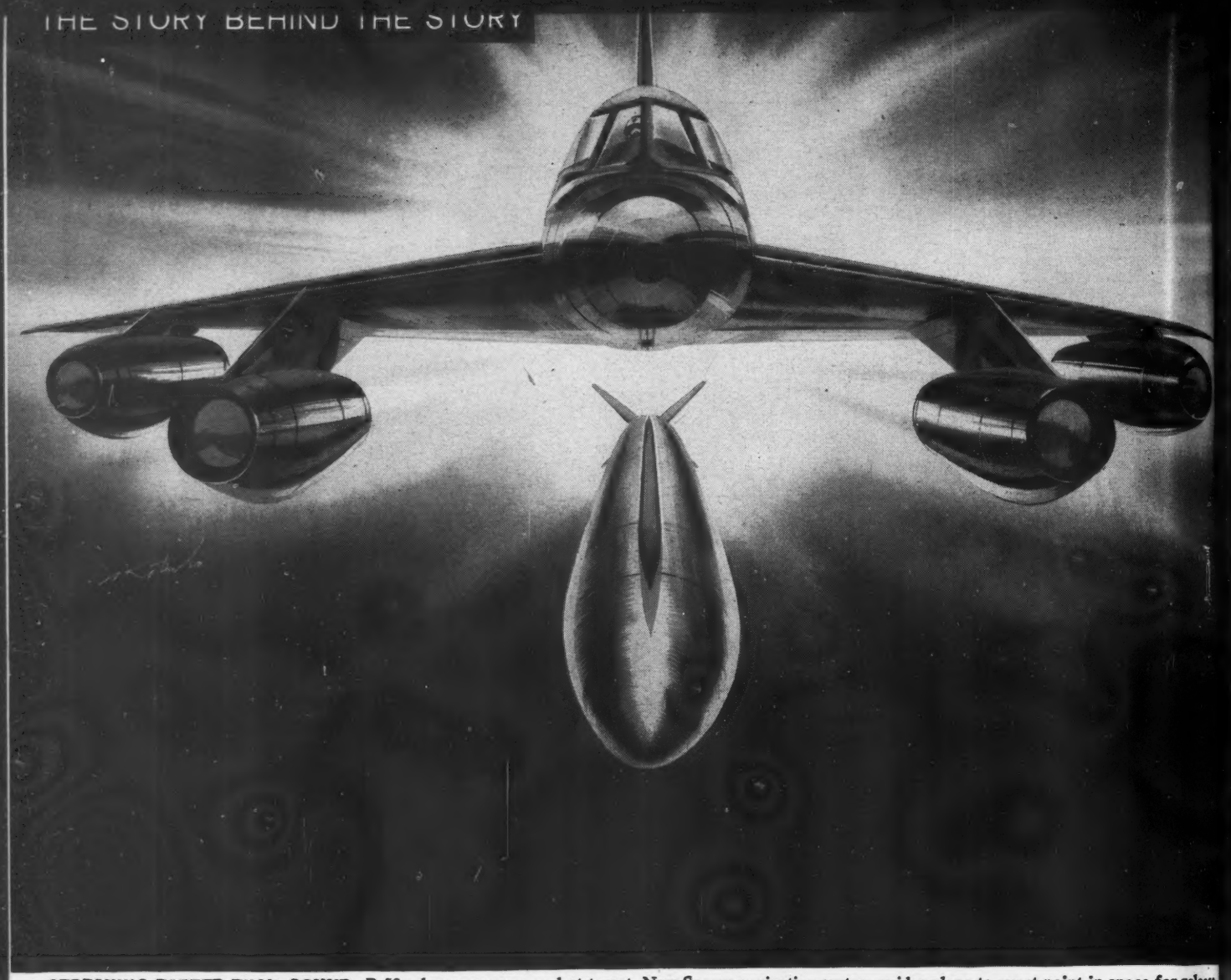

STREAKING FASTER THAN SOUND, B-58 releases weapon pod at target. New Sperry navigation system guides plane to exact point in space for release. Day or night, in any weather, at altitudes above 50,000 feet, it holds "Hustler" on course with accuracy 10 times greater than any other system now in use.

1907 — First Air Force plane, the Wright Flyer, flew only 42 mph, had a range of about 50 miles. Intrepid pilots had few instruments, depended largely on luck, personal skill.

1957 — With round-the-world flight routine, today's Air Force crews have finest training and finest equipment nation can provide.

FIRST SUPERSONIC BOMBER NEEDS ONLY 3-MAN CREW

Electronic guidance equipment makes operation virtually automatic

This is an aggressor's eye view of SAC's "Hustler"—Convair's delta-winged B-58—world's first supersonic strategic bomber.

The "Hustler" is also the most nearly automatic airplane yet developed. It is equipped with newly developed Sperry electronic navigation and guidance systems which automatically direct it at speeds well above that of sound.

Advanced gyroscopes, electronic sensing elements and computers hold the plane on course for thousands of miles over uncharted regions. Continuously providing data for automatic correction of the smallest deviation from course, they perform in split-seconds complex calculations with precision and accuracy far beyond the capacity of human beings. These instruments even calculate the precise moment for release of the B-58's unique throw-away weapon pod.

This year the Air Force is celebrating its 50th anniversary. Weapons like the "Hustler", manned by the best-trained crews in aviation history, enable the Air Force to put real meaning into its slogan, "Guardian of Freedom", and make any would-be aggressor stop and think. For 47 years Sperry's work in gyroscopics, electronics, flight control and radar has helped build the strongest Air Force on earth.

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video-relaying equipment, electronic parts of celestial and inertial systems, and radar beacons.

Airmen in the Control Systems specialty study equipment used for integration, temperature control, gyro erection, and stable platform control. Such systems are defined as equipment which operate the missile flight controls either directly or through hydraulic or pneumatic servomechanisms in response to signals from the guidance system and the missile's instruments.

The third breakdown in the career field involves instrumentation equipment. The men in this specialty work with equipment used to measure pressure, temperature, strain, leading position, and velocity. Such equipment includes multiplexing devices, telemetering transmitters and receivers, and remote-indicating and recording devices.

The Guided Missiles System Career Field is not overcrowded. Most of the airmen now assigned to it—with a grade spread of airman second class to warrant officer—are men who have previously worked on conventional propeller-driven aircraft and the entire span of Air Force jets. Many have been retrained into the missile field with special courses conducted by the Air Training Command and civilian instructors.

What are the requirements? A knowledge of electronic theory and the principles of servomechanisms is valuable, and missile specialists must know something of differential equations, algebraic formulae, and blueprint reading. High school level courses in radio, electricity, mathematics, and physics are desirable.

As airmen's experience and skill increase, the missile career field is being broadened. One example of this is the new AFSC series 43200—missile maintenance, part of the Air Force's program of creating its own training and maintenance program as missiles leave the experimental stage. There are career field opportunities here for officers, with assignments such as Guided Missile Operations Staff Officer and Operations Officer.

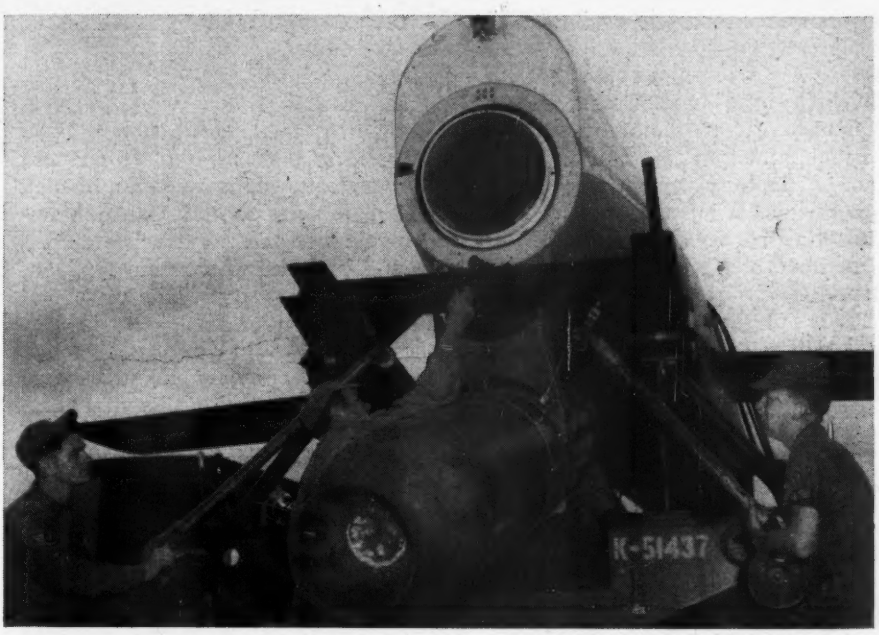
An airman entering the maintenance field would find his work on the surface-launched missiles—such as the Martin TM-61 Matador—not too unlike light jet plane maintenance. He would attend a specialist course at a technical school, learning basics, and then would specialize on a particular missile—the Snark, Matador, or Rascal. After advancement in rank and increased experience, he would return to school for the missile technician course.

This year four new missile courses have been announced and the Air Force is manning its first ballistic missile base at Cooke AFB, Calif. ATC is conducting three courses at Lowry AFB, Colo., one for guidance systems officers on air-launched Hughes GAR-1 Falcon rocket missiles, another for air-to-ground Bell GAM-63 Rascals, and the third for ground-to-ground Martin Matadors. The fourth course, at Chanute AFB, Ill., is for missile engine mechanic airmen.

Concurrent with these, SAC has hand picked sixty men for a course at

(Continued on following page)

Technicians disconnect the exhaust hose from the TM-61C Matador missile before launching at Patrick AFB, Fla. Hose cools missile electronic components.



Armament technicians at Patrick connect the RATO unit to the Matador missile. RATO is a rocket booster used to accelerate the missile in initial flight.

Lowry student learns motor adjustment technique on the Hughes GAR-1 Falcon.

USAF's Falcon missile, a guided aircraft rocket, carries its own powerplant which drives it at supersonic speed. Airmen here ready it for a launching test.

a civilian school in California prior to assignment to the 556th Strategic Missile Squadron at Patrick AFB, Fla., for the Snark operation.

Let's meet a missileman. One such pioneer is M/Sgt. Roscoe C. Evans, a member of TAC's 589th Tactical Missile Group at Orlando AFB, Fla., who is presently doing important work with a B model of the Matador. Sergeant Evans, incidentally, was recently recognized as one of USAF's Outstanding Airmen of 1957 at the August convention of the Air Force Association.

He started missile work back in 1946 after chalking up about 1,200 hours as a pilot in B-24, B-25, and B-29 aircraft. He is a veteran of such missile projects as the Martin Matador guidance and the Banshee guided missile, and also worked on the Shanicle guidance system. One of several airmen chosen to participate in missile maneuvers in Europe not long ago, this is Sergeant Evans' advice to airmen interested in this vital field:

"Being interested isn't enough . . . a man must have an education to work well and progress in the field."

The Northrop SM-62 Snark, long-range strategic missile, one of the many in the Air Force armory, has undergone many successful tests at Patrick AFB, Fla.

ABOUT THE AUTHOR

Mr. DuPre, an employee in the Office of Information Services, Hq., USAF, has been connected with AF information, both in and out of service, since 1942. Earlier, he was sports editor of the Dallas Journal *and a staff writer for the Dallas* News.

Sergeant Evans practices what he preaches. He prepared himself for missile work by attending vocational school four hours a day for four years and in addition took almost all available USAFI courses on missiles and electronics. He says the field is changing constantly and that study must keep pace with changes, lest effectiveness be lost overnight.

The importance of the missile field is continually pointed up as missile news dominates headlines. For example, in midsummer a new Falcon missile was unveiled by Hughes and will go into operational use by ADC forces. The new Falcon has been tested under all-weather conditions at the ARDC development center in New Mexico, and has successfully tracked and destroyed Matadors and F-80 jet aircraft. In addition, SAC has plans to activate the first squadron of Bell Rascal missiles for operational use, with launchings to be made from Boeing B-47 Stratojets.

Also, new missile contracts have been placed with Northrop for Snark SM-62 intercontinental guided missiles, with Boeing for the Bomarc ground-to-air missile, and with General Motors for the Thor intermediate range ballistic missile.

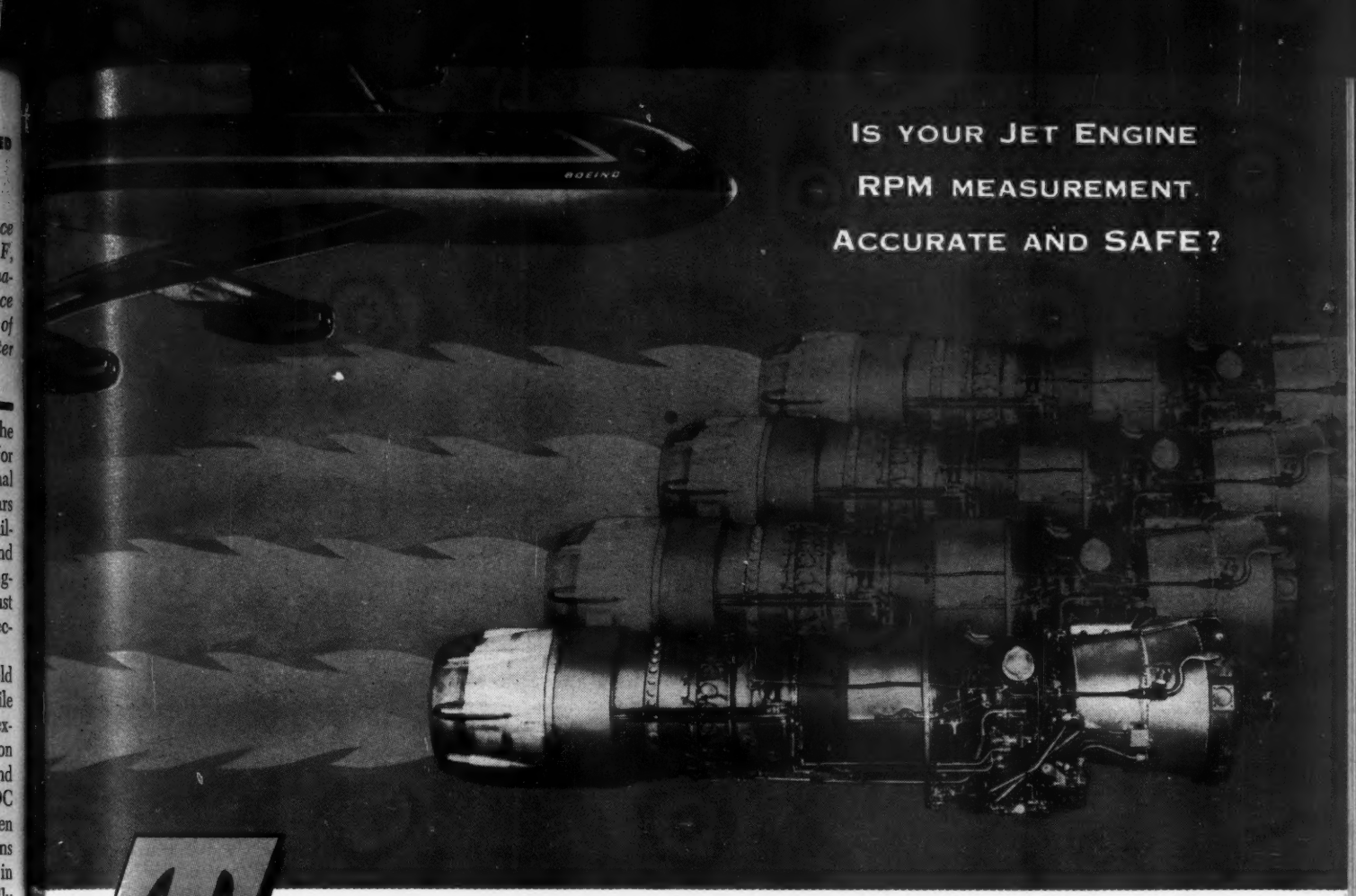
Already activated is the first Ballistic Missile Division Headquarters at Cooke AFB, Calif. Under supervision of Maj. Gen. Bernard A. Schriever, its mission is to plan future operational ballistic missile units.

The need for trained airmen to man more and more units like these will continue to increase. Standing on the threshold of the future are the missilemen of the USAF.—END

A REMINDER

Beginning January 1, because of rising costs, the subscription rate for AIR FORCE *Magazine will increase from $4.00 to $5.00 per year. The cadet rate of $3.00 for AF ROTC cadets and CAP cadets will not change, however.*

Also, as voted by delegates at the August AFA convention, annual dues for active, service and associate members of AFA will increase from $5.00 to $6.00.—END



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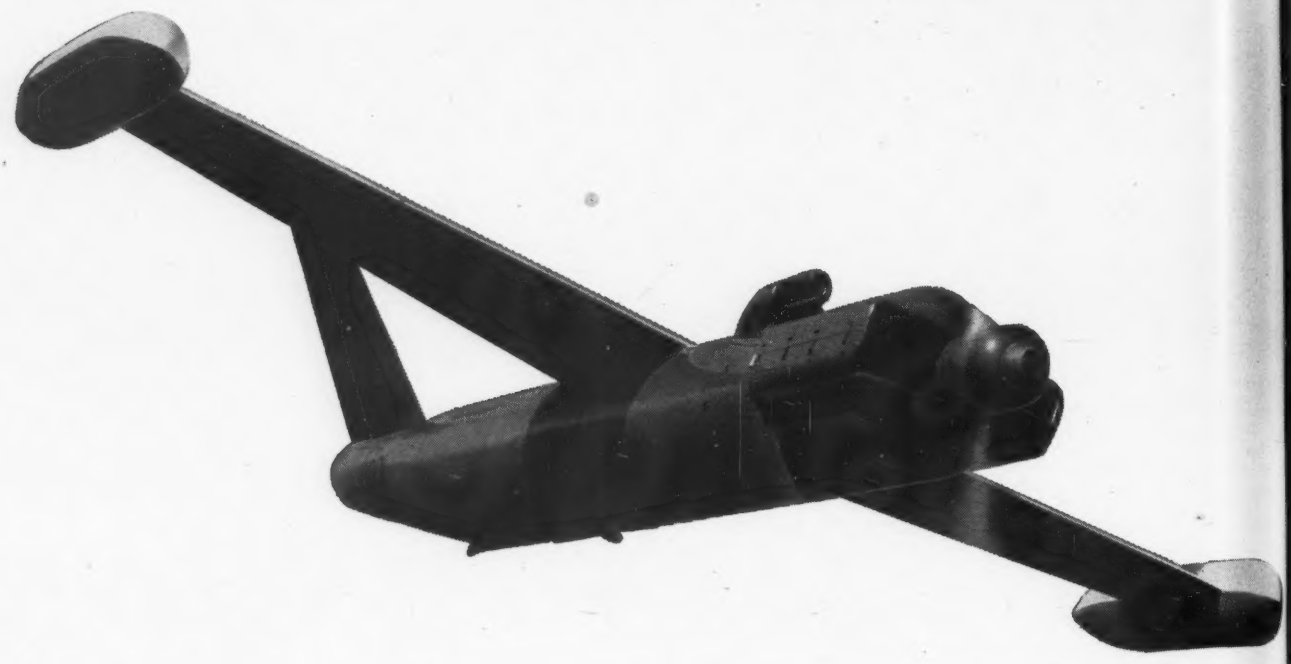

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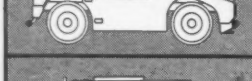
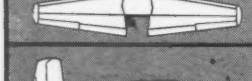
	C-26, MD-3 POWER UNITS
	TANK-WING-MAJOR SUBASSEMBLY SUBCONTRACT PRODUCTION
	BEECHCRAFT T-34 TRAINERS
	BEECHCRAFT L-23 TRANSPORTS
	4-PLACE BEECHCRAFT BONANZA
	6-PLACE BEECHCRAFT TWIN-BONANZA
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The Navy's XKDB-1 target plane, shown above, was Beech Aircraft's first major project in the missile field. Its evaluation has revealed high performance in stability, controllability, and launching and recovery.

Beechcraft engineers are currently developing a whole family of rocket and turbo-jet powered drones. One of these, the Model 1013, can be equipped with multiple camera installations for both day and night observation. It also has the alternate capability of delivering tactical supplies to isolated combat units.

Other Beech projects include research and development work on launching and recovery systems for missiles, drones and manned aircraft; engineering test programs on aircraft emergency escape systems; and classified projects in the advanced fields of aerodynamics, cryogenics, thermodynamics, and aircraft range extension.

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Tech Talk

By Bob Strobell

First photographs of the new Convair F-106A Delta Dart shows similarity to its sister ship, the F-102A. Mission of the new interceptor is to stop enemy air attack. It is capable of flight to stratospheric altitudes and of ferreting out and destroying enemy aircraft in any kind of weather, day or night. It will be used by the Air Defense Command.

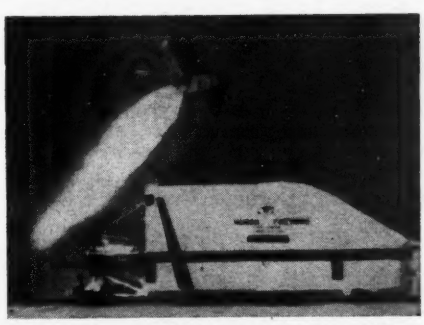
Additional details and photographs of the **supersonic Convair F-106A** (*see cut*) were recently released jointly by the Air Force and Convair. The triangle-winged plane, **nicknamed the Delta Dart,** has been undergoing flight tests at Edwards Air Force Base. Mission of the new interceptor is to stop possible enemy air attack. The plane is equipped with the **most advanced electronic fire control system and armament** yet developed for an Air Force interceptor. It is capable of flight to stratospheric altitudes and of ferreting out and destroying enemy aircraft in any kind of weather, day or night.

All fuel is carried internally to preserve the clean aerodynamic shape of the interceptor. The fuselage is over seventy feet long and has a wasp waist to conform to the area rule design first applied to the F-106's sister ship, the supersonic F-102A. The F-106A bears a close family resemblance to the F-102A.

Like all true deltas, the F-106A **does not have a horizontal stabilizer.** Control is achieved through movable "elvon" surfaces in the trailing edge of the wing. These function both as elevators and ailerons. The vertical stabilizer reaches almost twenty feet above the ground when the plane is resting on its tricycle gear and is swept back, with a squared-off tip. Clamshell dive brakes are located at the base of the vertical stabilizer. A two-place version of the new interceptor, designated the F-106B, is under development at the Convair San Diego plant.

A pilot-saving, **rocket-propelled ejection** seat (*see cut*) designed to **operate at any altitude** is being tested by **North American Aviation** engineers at the firm's Columbus, Ohio, division and at the Naval Air Facility, China Lake, Calif. The new ejection seat will safely allow jet pilots to escape from aircraft in distress on the ground, while taking off or landing, or at any altitude. Ejection from a crippled aircraft close to the ground formerly meant death or extensive injuries. Now, with the seat device perfected by North American engineers, **ejection at any altitude means survival for the pilots.** For ejection the **pilot triggers a rocket mounted in the base of the seat,** which propels the seat high above the aircraft. At a precise point, the pilot is automatically separated from the seat, and the parachute snaps open, lowering the pilot safely to earth.

RADAN, made by General Precision Laboratory, is a lightweight, highly accurate radar navigation system which operates independent of ground or celestial aids.



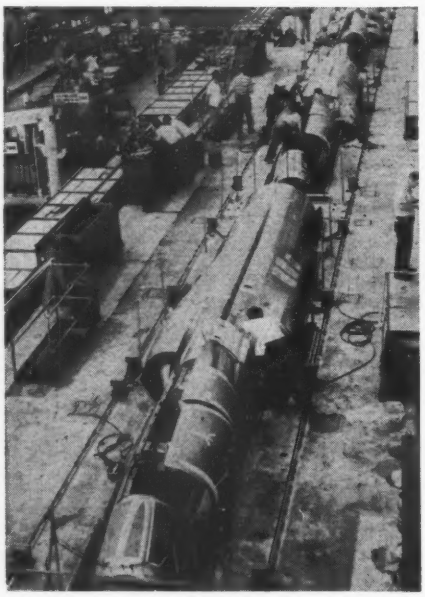
Rocket-propelled ejection seat allows pilots to bail out at zero altitude.

Operating details of a **lightweight, highly accurate, automatic navigation system** which "walks" an aircraft across the face of the earth on giant, invisible

(Continued on following page)

Lockheed Aircraft Corp. produced its new ten-passenger ultility transport, the "JetStar," in thirty-four weeks from the day engineering started. Powered by two Bristol Orpheus jet engines attached to the rear of the fuselage, it can cruise at 500 mph at 40,000 feet. Engine location results in low sound levels in passenger compartment. They are easily accessible for ground maintenance.

Vertical fin on Boeing B-52A has been shortened by six feet in test to improve production bombers. Effectiveness of cross-wind landing gear made smaller fin surface possible. Short fin reduces drag and increases range.



Lockheed F-104 fuselage assembly line at Burbank, Calif. After mating the fuselage sections in the area shown here, the entire fuselage is taken by truck to the company's Palmdale plant for final assembly and flight testing.

"legs" of microwave energy at well above the speed of sound were revealed by the **General Precision Laboratory of Pleasantville, N.Y.** Known as RADAN (Radar Doppler Automatic Navigator), the eighty-nine pound system occupies 4.4 cubic feet of space (*see cut, page 81*) and consists of an antenna-receiver-transmitter, frequency tracker, plus control and display panels. It functions at altitudes up to 70,000 feet, equally well at all points of the globe, is **unaffected by weather conditions,** and is completely **independent of ground-based or celestial aids.** RADAN is one of a family of systems developed by GPL over a period of ten years. The navigation systems are completely self-contained within the aircraft. They **operate by transmitting microwave energy** to the ground and measuring the return reflection. The Doppler shift—the difference in frequency between the transmitted and "echo" signal—gives the pilot the basic information he needs for navigation—ground speed and drift angle.

When connected to a variety of computers and heading references, the **Doppler systems become completely automatic,** and allow the pilot to fly "no hands" anywhere, over the best and shortest routes, in any weather, at the best altitudes, taking advantage of the most favorable winds.

Lockheed's jet utility transport, the ten-passenger JetStar, successfully completed its maiden flight recently, beating by two minutes a date-in-the-sky set when engineers started only 241 days previously. **From start of design to the first flight took only thirty-four weeks.**

The 500-mile-per-hour plane (*see cut*) was developed specifically to meet Air Force requirements for a small, speedy, versatile transport providing jet performance for "utility" needs. The JetStar has a range of 1,700 statute miles but can extend the distance with external fuel tanks. It measures fifty-eight feet from sharp-pointed nose to tail. Mounted high on the vertical fin, the horizontal stabilizer is completely out of the path of jet exhausts. The wing is swept back thirty-four degrees along the leading edge and spans fifty-eight feet. Two Bristol Orpheus engines, mounted in pods behind the wings on each side of the rear fuselage, deliver 10,000 pounds of takeoff thrust.

Production responsibilities for the plane, built with Lockheed's own funds, will be handled by the company's Georgia Division, Marietta, Ga. A second prototype, scheduled for rollout early next spring, will be powered by four General Electric J-85 or four Fairchild J-83 jet engines.

A **large nuclear-powered air transport** with virtually **unlimited range** is practical and **can be built** according to Robert W. Middlewood, chief engineer of Lockheed Aircraft's Georgia Division at Marietta. The nuclear-propelled airlift giant **will not be dependent on large overseas stocks of chemical fuel** for military operations. For example, a fleet of nuclear transports could move an army division from San Francisco to Manila nonstop, land or paradrop the cargo in the Philippines, and return nonstop to America, all without the need for intermediate bases or the necessity of a supply of fuel anywhere outside the continental US. The nuclear-powered transport will most likely be a turboprop.

The round-trip nonstop range of a nuclear transport to any point on the globe would add a tremendous new military advantage for this nation.—END

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A major activity of ERCO's weapon support program is weapon transportation. In this area, ERCO has designed and mass-produced equipment ranging from space saving, highly mobile shipboard dollies, trucks and skids, to versatile and highly specialized transports of larger and more sophisticated construction. Some of these transports carry weapons weighing 12 tons over the most rugged terrain.

Another important phase of ERCO's program is the design and manufacture of complex electronic and electro-mechanical test and check-out equipment as support for missile launching and flight guidance systems.

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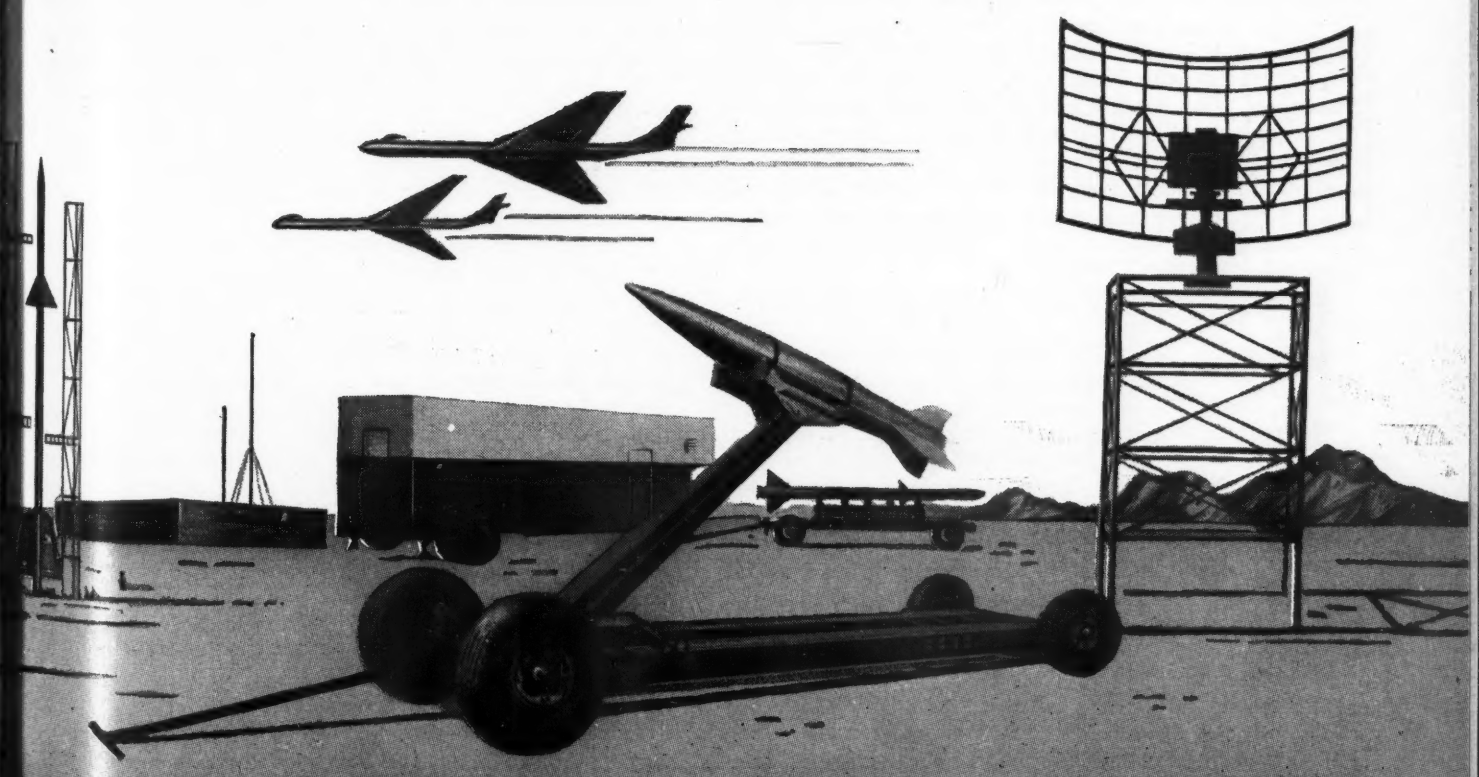

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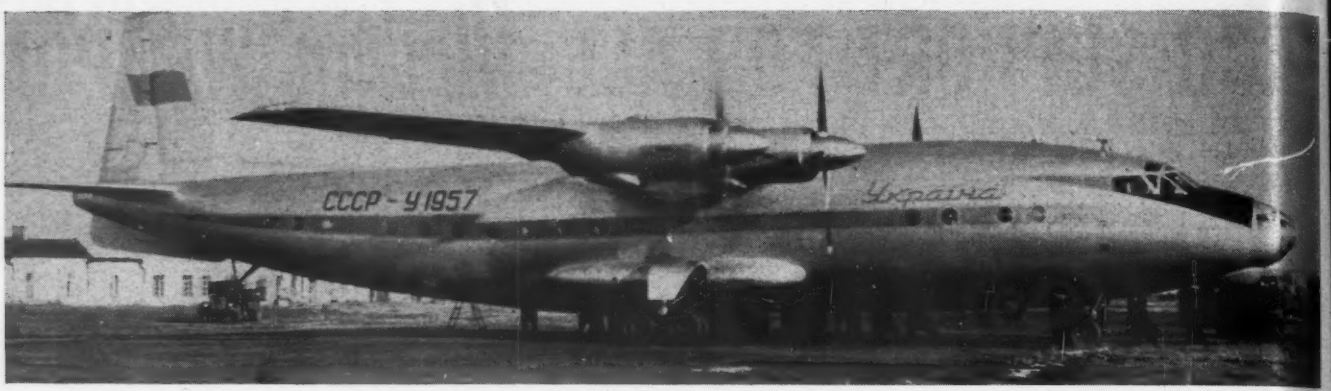

Sovfoto

An improved version of its predecessor, the Russian AN-10, new cargo carrier and transport, is designed for economy.

A Red Airpower Feature

THE RUSSIAN AN-10 TRANSPORT

WITH their annual Aviation Day, scheduled for late June, canceled because of bad weather or bad politics, the Soviet government decided in July to give the Russian people a look at some of the aircraft that were to have taken part in the annual air show.

The display of four transport aircraft, at Moscow's Vnukovo Airport on July 10, had restricted attendance. None of the western press was invited, and so accounts of the ground display are largely from the Soviet press.

Four transports were shown; three were new. Two were powered by turbojet, two by turboprop engines. One of the turbojets was a new version of the familiar TU-104, which Aeroflot, the Russian airline, now flies regularly into Prague, Czechoslovakia, to Tashkent and Khabarovsk inside Russia, and across Siberia to Peiping, China. The new version of the airplane is designated TU-104A. It has a rather large tourist compartment with fifty-four seats in a five-abreast arrangement. Two smaller compartments, with eight seats each, are for first-class passengers. The aircraft has an improved version of the AM-3 engine in the TU-104. P. F. Zubets is credited with the principal design work on the improved powerplant, which is in production at the Mikulin engine works near Moscow. The new engines give the aircraft better range, according to the Russian press, which reports the maximum range as about 1,800 miles.

The second turbojet-powered transport is the TU-110, designed by Tupolev and equipped with four engines designed by A. M. Lulka. The TU-110 will be brought out in two seating arrangements for seventy-eight and 100 passengers. It has a range of about 2,200 miles.

The two turboprop transports are powered by identical powerplants, the Kuznetsov 4,000-eshp engine driving four-bladed props. Each aircraft has four of these very efficient engines.

Newest of the turboprops is the product of S. V. Ilyushin's design bureau and has been named the *Moscow*. In many ways the aircraft resembles the Lockheed Electra. It will carry seventy-four to 100 passengers, and the seats are so mounted that they can be removed readily to make room for freight.

The second turboprop, called *Ukraina* or AN-10, was designed by O. K. Antonov. It was announced last spring and AIR FORCE Magazine has secured the following exclusive data on the aircraft and its performance:

The airplane is designed to accommodate from seventy to eighty-four passengers, and is operated by a crew of five. It has a twin-wheel tandem landing gear arrangement (bogies) which retracts into the sides of the fuselage. There is a retractable nosewheel. A shock absorber on the underside of the tail also retracts during flight.

The AN-10 represents some design advances over the AN-8, shown first on Aviation Day in 1956 and described in detail in AIR FORCE, July 1957.

The AN-10 has tapered wings, of great aspect ratio, attached to the top of the fuselage. The oil cooling system for the engines is underneath the engine nacelles; engine exhaust gas outlets are beneath the wing. The axial flow turbines drive four-bladed propellers that are 14.7 feet in diameter through a gearbox ahead of the turbine.

The fuselage is marked by its great diameter—14.75 feet—which indicates the airplane has been designed as a cargo carrier as well as a passenger transport. It can carry 3.5 tons of cargo in addition to its normal passenger load.

There is a cockpit for the navigator, a feature of all of the newer Soviet transports, and a bulb under the nose for radar. The stabilizer is under the tail of the aircraft, an uncommon location.

The Russians say the aircraft has been designed for very economical operation. They claim its turboprop engines are the most efficient in the world for engines of this type and power output. At sea level, the engines are said to have a specific fuel consumption of only 0.27 pounds per horsepower per hour. At an altitude of 26,300 feet and a speed of 342 mph their specific fuel consumption is said to go down still more, to 0.21.

Most economical cruising is obtained by throttling the engines to seventy-five percent and assuming an initial flight altitude of 26,300 feet and a gradual climb to a final altitude of 32,700 feet, with flight speed maintained at 342 mph and with fuel reserve for two hours. The range is 2,235 miles for the maximum payload arrangement (*see Table of Weights*), excluding distance covered while climbing or landing. For the maximum fuel supply arrangement (*see table*) and the same conditions as cited above, the range is 3,043 miles.

It is estimated that to climb to 26,300 feet, the airplane covers a distance of 100 miles. With a maximum fuel

(Continued on page 86)

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supply and without taking any fuel reserve into account, the range could be stretched to as much as 3,500 miles.

The *Ukraina* gets off the ground in about 2,600 feet in the forty-five-ton version. Landing speeds are 115 mph for the forty-five-ton loading and 108 mph for a forty-ton loading.

The Russians claim the airplane can be operated from sod fields, and with only three engines if necessary. This is important in the USSR, which has many sod fields at important cities. It must be assumed, however, that they will not be able to use an airplane of this weight on sod during the rainy spring and fall seasons.

Like all Russian commercial planes, it has much navigation-communications equipment, including several VHF frequencies, ILS, radar, radio altimeter, and an astro compass.

This new transport, soon destined to go into service, will be used both on Russian internal routes and to fly to foreign countries, according to the Soviet press. It also is quite probable that it or its predecessor, the AN-8, will be used to fly the Arctic regions as well. The Chief Administration of the Northern Sea Route, which is a part of the Ministry of Sea Transport, maintains vast facilities in the region, including more than seventy weather stations along the Arctic seacoast. Normally, this sea route is open only two months of each year, so supplies and personnel for these weather stations and other facilities must be flown in at regular intervals. Crews at the weather stations are changed every four to six months, and each of the crews consist of four to six men. —END

SPECIFICATIONS

Span	141 ft.
Length	118 ft.
Fuselage, largest diameter	14.7 ft.
Wing area	1,883 ft.
Mean chord	13.1 ft.
Span, horizontal tail unit	33.3 ft.
Area, horizontal tail unit	373.6 sq. ft.
Area, vertical tail unit	231.3 sq. ft.

TABLE OF WEIGHTS, MAXIMUM FUEL AND PAYLOADS

	Maximum Disposable Fuel Load	Maximum Payload
Empty weight	61,600 lbs.	61,600 lbs.
Fuel	39,820 lbs.	28,600 lbs.
Crew	880 lbs.	880 lbs.
Payload	16,500 lbs.	27,720 lbs.
Takeoff weight	114,000 lbs.	114,000 lbs.

PERFORMANCE DATA

Both straight and level and climbing performance data are given in the two tables below. Horizontal speeds are calculated for three different engine settings, and at the forty-five-ton aircraft weight, a medium figure for the AN-10. Rates of climb for the aircraft at forty-five tons and at fifty-four tons are given in the second table.

At maximum turbine output, the aircraft makes its best horizontal speed, 394 miles per hour, at 22,000 feet. Throttled at ninety percent, with a climb rate of 200 feet per minute as required, the service ceiling for the fifty-four-ton version is 31,000 feet; for the forty-five-ton weight it is 36,300 feet.

STRAIGHT AND LEVEL PERFORMANCE

Altitude	Speed in miles per hour for indicated throttle settings		
	100%	90%	75%
0 ft.	340	357	335
10,000 ft.	380	368	342
20,000 ft.	392	374	346
26,300 ft.	390	372	338
32,700 ft.	372	359	—

RATES OF CLIMB

Altitude	Climb speed, feet per minute		Time to climb, minutes	
	54 tons Gross	45 tons	54 tons Gross	45 tons
0 ft.	2,100	2,925	—	—
10,800 ft.	1,520	2,000	6	4.5
21,600 ft.	920	1,320	12.0	10.0
26,300 ft.	480	880	22.5	15.7
32,700 ft.	—	400	—	26.0

ENGINE DATA

Four Kuznetsov turboprops	4,000 hp. each, max.
Specific fuel consumption	0.27 lbs/hp/hr (approx.), at sea level
Outside diameter of engine	3.6 ft.
Frontal area	10.2 sq. ft.

Production models will have an improved engine of unknown performance. Credit for the improved engine is given to A. G. Ivchenko, a new name in Soviet engine design, as well as to Kuznetsov. Apparently it was a joint project.

Beginning a dramatic new chapter in the story of CANADAIR

CANADAIR CL-44

Canada's impressive new turbo-prop aircraft

The CL-44, the Royal Canadian Air Force's newest strategic transport aircraft, is now in full scale production at Canadair. The CL-44 is available in commercial cargo and passenger versions for delivery in 1960.

Canadair invites enquiries: Please contact Karl H. Larsson, Manager Commercial Aircraft Sales.

A proved Combination

The CL-44, both military and civil, is a developed version of the Bristol "Britannia". It offers users a *triple combination*: the ultimate development of a thoroughly tested parent, American standardization, and the efficiency-speed advantages of the foremost turbo-prop engines. As a result, the CL-44 promises to be an economical, flexible and practical transport for long and medium hauls.

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Because the CL-44 is designed for future transport requirements, its development is being closely watched by many airlines, freight carriers and air forces.

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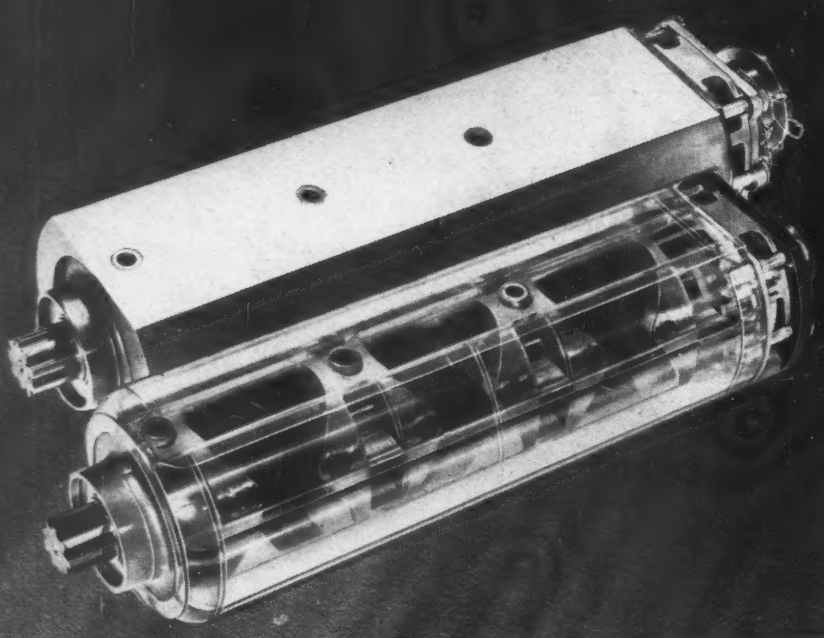

AiResearch Cam-Piston Air Motors function with complete reliability at extreme temperatures—require no conventional lubrication or cooling

SPECIFICATIONS

Model Numbers	CM-710 *(illustrated)	CM-350	CM-160
Total Length (in.)	13.3	11.8	9.7
Min. Height (in.)	3.1	2.9	2.5
Max. Dia. Envelope (in.)	4.0	3.2	2.5
Weight (lb.)	22	15.5	7.5
Output at 200 psig supply pressure and 1200 rpm (hp)	18.5	9.1	4.2
Starting Torque at 200 psig supply pressure (inch-pounds)	1800	890	400

Here are air motors that operate dependably far beyond the temperature limits of electronic and hydraulic units.

Using bleed air as a source of energy, the output of the air motor is almost linear with inlet pressure, allowing maximum efficiency through a wide range of operating conditions. High horsepower and torque to weight ratios are obtained by displacement volume per revolution exceeding the overall volume of the motor.

Motor acceleration is extremely fast — less than .05 second in most applications. Low rotating speeds — from 100 rpm to 2500 rpm — make gear reduction unnecessary and minimize problems of over-speed control, rotational stresses and wear.

Flexibility of the basic design allows for a wide range of motor sizes — from less than 1 hp up to 300 hp — depending on the available pressure supply. Length vs. diameter shape can be changed by varying the number of pistons and/or the piston diameter and stroke.

When coupled with a ball screw which may retract within the full length of the motor shaft, the cam-piston air motor has wide application as a compact, high-performance linear actuator in high temperature pneumatic power control systems.

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AFA NEWS

SQUADRON OF THE MONTH

Boise Valley Squadron, Cited for

its successful observance of the Golden Anniversary, and for its program which called attention to USAF development, and highlighted the careers of Idaho pioneers in the sky.

When a program attracts over fifty percent of the total population of your city, it is surely successful and that's what the **Boise Valley Squadron** did on September 6-7 to mark the Golden Anniversary.

Gill Robb Wilson was the principal speaker at the kick-off banquet on the sixth. Two separate jet speed runs, an air show, a model plane meet, and an exhibition of modern AF planes packed the rest of the program, which was topped off by an Anniversary Ball on the night of the seventh.

An F-86 Sabrejet, piloted by **Lt. Don Newbill,** made the run from San Francisco to Boise in fifty-two minutes, and an F-102 piloted by **Col. Leon Gray,** Deputy Commander of ADC's 9th Air Division, flew in from Spokane, 290 miles away, in just twenty-five minutes.

Thirty contestants entered the model meet for radio controlled and "stock" models, exhibited to an audience of more than 1,500. Over 30,000 Idahoans watched the air show, topping anything ever before staged in the area. Featured were parachute jumping exhibitions, speed runs, and the aerobatics of the **"Bald Eagles,"** from the Fresno, Calif., Air National Guard Unit.

Gov. Robert E. Smylie was among the honored guests at the banquet. The entire program was under the direction of **Dale Hendry,** who was a member of the AFA's **Air Guard Council** in 1956-57. **Bill Bozman,** Boise Squadron Commander, and **James Trail,** Northwest Regional Vice President, were his chief assistants in staging this great show.

We're happy to salute the Boise Squadron for this fine program, and congratulate them on being named "Squadron of the Month."

Mayor Robert Sabonjian presents charter to Waukegan Flight Commander Richard P. Bleck, while Nicholas Schwall, Wing Organization Chairman, and William M. Smith, right, looks on. Flight is the newest in the Illinois Wing.

Maj. Gen. William T. Hudnell, Pacific Area Air Materiel Force Commander, admires Airpower Plaque won by Joseph C. Jacobs, right, formerly of Utah.

The Falcons, a youth group sponsored by the Pittsburgh Squadron and Auxiliary, built this model airport and terminal, shown at Wing Convention.

A smashing climax to the AFA buildup in **Hawaii** is planned for November 22-23, in Honolulu, when the **Pacific Area Jet Age Conference** will be sponsored by the Association's members there. **Roy J. Leffingwell,** Regional Vice President, heads the planning group.

The first day of the conference will center on a discussion of air space control, jet noise, military and civil requirements, and other Jet Age problems. The second day will be concerned primarily with the educational requirements of the future.

While Hawaii may seem remote to some of us, it is there that the Jet Age will first become a matter of course, for the first **Boeing 707** will be delivered to Pan American Airways, and that line plans to place it in service first on the run through Hawaii and the Far East. This makes the conference a "natural" for the area, since all of the problems connected with jet travel will be encountered first in Hawaii.

Dr. Robert H. Goddard, of Clark University, called the "father of rocketry" before his untimely death in 1945, was honored posthumously by the **Worcester Squadron** on September 14, at a dinner in the Hotel Bancroft, Worcester. In observing the Golden Anniversary, the Squadron recognized the achievements of Dr. Goddard and presented a bronze plaque to his widow, **Mrs. Esther G. Goddard. Lt. Gen. C. S. Irvine,** Deputy Chief of Staff, Materiel, was principal speaker at the banquet. General Irvine received a special Golden Anniversary plaque from the Squadron in recognition of his long Air Force career. **Charles D. Briggs, Jr.,** a member of the Squadron, made the presentation.

Honored guests included **Dr. Howard B. Jefferson,** President of Clark University; **Rep. Harold D. Donahue;**

(Continued on following page)

Lee Cordell, left, Illinois Wing Commander, congratulates Hymie Boronstein, Commander of Flying Minutemen Squadron, while Scruggs Colvin, Howard Gilkes, Leon Piggott, and Bob Vaughan look on. Minutemen are all O'Hare Reservists.

Lee Smith and Lt. Col. W. A. Shomo watch Pittsburgh Mayor David F. Lawrence sign Airpower Proclamation.

Above: M. F. Cliff, Orange County Cmdr.; Ed Hall, LA Airways Manager; R. M. Hubley; and John Ball.

and **Vice Mayor Andrew B. Holmstrom. Robert W. Stoddard,** chairman of the Worcester Airport Commission, was Toastmaster.

AFA's second official **Airpower Council** is now in being, following a luncheon meeting in Denver, Colo., at which **Gill Robb Wilson** outlined the objectives of the Association to a group of seventy community leaders of the Mile High City.

Ted Stell, Denver Squadron Commander, and **Gwynn H. Robinson,** a member of the Board of Directors, were instrumental in forming the Council. Stell was chosen to serve the council as permanent secretary, furnishing a liaison with the local Squadron.

Mr. Palmer Hoyt, publisher of the Denver *Post*, served as temporary council chairman during this same period. **Edwin C. Johnson,** former governor and senator, is permanent chairman.

The full membership of the council covers every phase of airpower activity in the city and reads like a "Who's Who" of Denver. We welcome this fine group to AFA, along with the other existing council, in Dallas.

The **New York Wing** Executive Committee meeting at **Mitchel AFB** on September 21 was an excellent example of sound planning and teamwork. Thirty officers, representing every Squadron in the state, spent several hours discussing the future programs of the Wing, and the various Squadrons. **Alden West,** New York Wing Commander, presided.

Following the meeting, the Committee, plus guests and friends of the area, attended a dinner at the Base Officer's Club, during which the new AF officers assigned to Mitchel were introduced, and the guests heard from **Lt. Gen. William E. Hall,** Commander, CONAC. **Lou Davis,** Commander of the **H. H. Arnold Squadron,** winner of the coveted President's Trophy for 1957 as AFA's Squadron of the Year, outlined the unit's plans for a Long Island-wide observance of the Golden Anniversary on November 10, featuring the theme of **"Citizen Airmen,"** honoring the reserve forces of the country.

Among the honored guests at the dinner were **Maj. Gen. Roger Browne,** 1st AF Commander; **Tex** and **Jinx McCrary; Julian Rosenthal,** AFA's Secretary; **Robert S. Johnson,** a past National AFA President; **Paul S. Zuckerman,** a National Director; **Col. Marshall Elkins,** Mitchel Commander; and **George Chapline,** Vice President of Fairchild and General Manager of its Engine Division.

Olmsted Squadron, Harrisburg, Pa., turned out one of the largest crowds, 1,500 strong, of the past few years for a double-barreled celebration on September 20, when the city observed the Fiftieth Anniversary of the USAF, and the Fortieth Anniversary of Olmsted AFB, at nearby Middletown.

Jack B. Gross, AFA's National Treasurer; **Steve Yednock,** Olmsted Squadron Commander; and **Bill Lunsford,** a Squadron member, were the principal committee chairmen, under the honorary chairmanship of Pennsylvania's **Gov. George M. Leader.**

Maj. Gen. Mark E. Bradley, Jr., USAF Headquarters, delivered the principal address. **Gen. Edwin F. Rawlings,** Commander, Air Materiel Command, was an honored guest, and briefly thanked the audience for its support of Olmsted's programs.

Although it was cut short by rain, the air show in the afternoon was well attended, including several hundred school children, who were enjoying a half-day holiday to see airpower in action.

CROSS COUNTRY. . . . Bob Brooks, a Past Commander of the Pasadena Squadron, has been appointed to the city's **Transportation Committee** of the Chamber of Commerce to continue the fight for a heliport. . . . AFA's unique **Flight Pay Protection Plan** is now protecting more than 12,000 members, over 100 of whom are presently collecting payments. . . . The **1958 New York Wing** convention has been set for Syracuse in June. Wing Commander **Bud West,** 115 Paddock Rd., Dewitt, N. Y., can furnish details. . . . Speaking of conventions, the **1958 National Convention** will open in **Dallas** on September 25, and close the 28th. . . . The **National Convention Site Committee's** survey of the facilities of Denver, originally planned for October 31, has been rescheduled for November 4. . . . Los Angeles Group's **"Operation Holiday,"** a cooperative program sponsored by all the LA area units, is set for December 6, at the Hotel Statler. As a witness to a previous program, we can recommend it highly to all Californians. . . . AFA **President Pete Schenk** will speak at the **Flight Safety Clinic** of the **California Flying Farmers** at Davis, Calif., on October 26.

—Gus Duda

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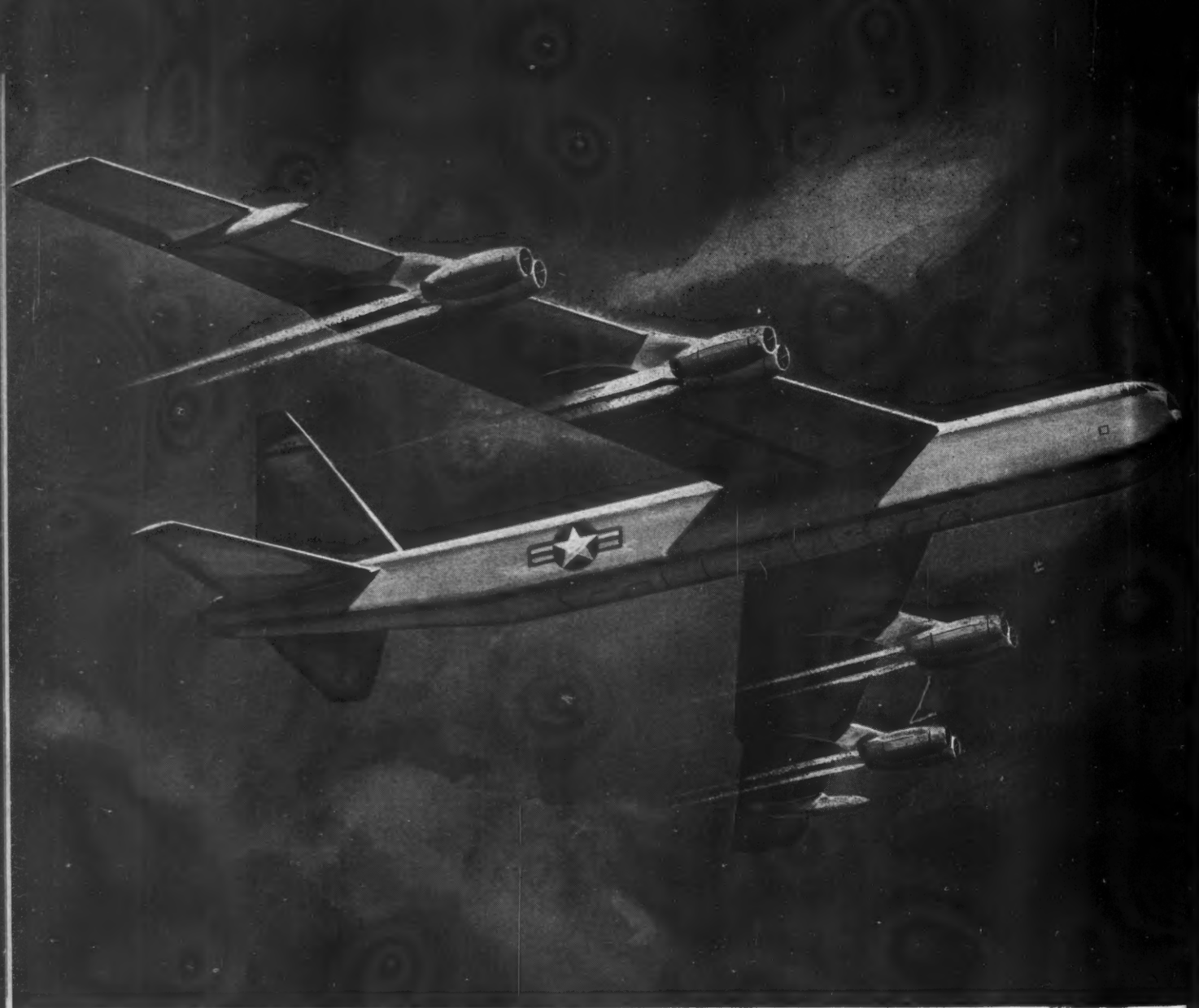

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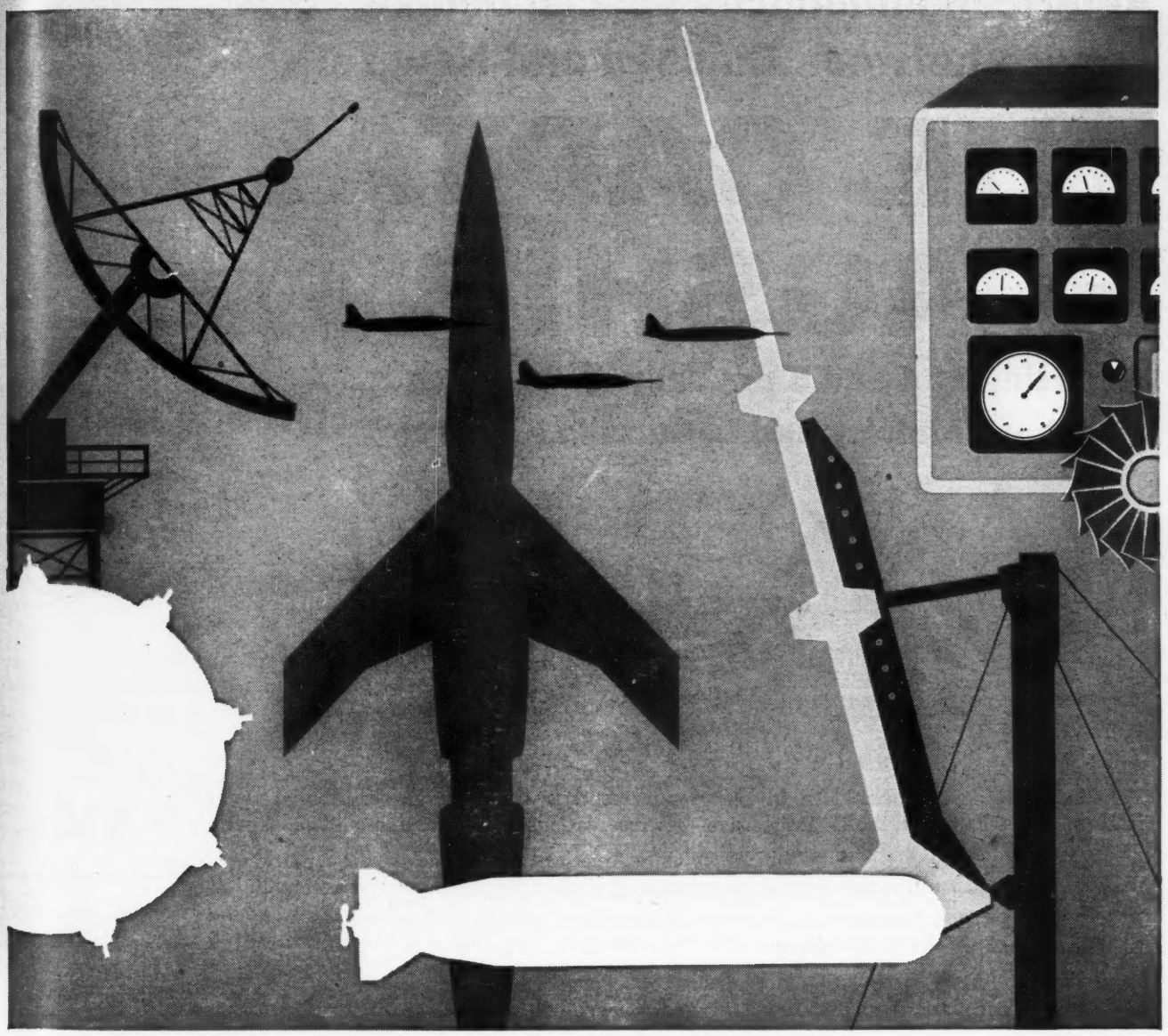

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MITCHELL AND THE GREAT OFFENSIVE

By Isaac Don Levine

In the summer of 1918, the Germans poised for a giant offensive which might have changed the outcome of World War I. Unveiling the enemy plan was a desperate Allied problem—solved by the daring of Billy Mitchell and his airmen. This account of the reconnaissance that altered history is from Isaac Don Levine's Mitchell, Pioneer of Air Power, *first selection of the* Airpower Book Club (see page 25) *reprinted by permission of Duell, Sloan and Pearce.*

DEFEAT was staring the Allies in the face when American forces moved to the battle front. Pershing had now discovered that Mitchell was right about the air service, which was staffed by good men "running around in circles," as he described it himself. He appointed Gen. Mason M. Patrick chief of the air service. Patrick assumed office, according to his own account, when at the front "the situation was exceedingly critical."

The 2d Division of the AEF, in savage fighting near Château-Thierry, helped to hold the enemy across the Marne. By the middle of June the Germans seemed to have paused for another leap, which everyone felt sure was coming, not knowing exactly where. Gen. Hunter Liggett, Commander of the 1st Army Corps to which Mitchell was attached, moved his headquarters to Château-Thierry. When Mitchell went there to coordinate the activities of his air force with that of Major Gerard, he noted in his diary: "I have never seen a more stunned group of people than the officers of the 3d French Army headquarters, and for that matter, the troops as well."

Mitchell observed that the Germans were girding for "one great final campaign." As the atmosphere was being charged more and more with expectation, he seemed like a veritable dynamo, flying over the front and to points of supply and various headquarters, and making preparations for the inevitable blow. He promoted Major Brereton from the command of the 12th Aero Squadron to the leadership of all attack operations. Brereton, like Mitchell, had also acquired the reputation among the pilots of being the kind of commander who "never assigned anyone to a mission that he would not do himself."

There was nothing orthodox about Brereton. He was a "radical" in air warfare. He demonstrated this on July 1, when together with Haslett he went up to do a special observation job for the artillery. Now the Germans enjoyed tremendous superiority in the air, flying in packs of fifteen to twenty planes. To overcome this, Brereton simply ordered ninety-six planes into the air to protect the observation machine. This was an extraordinary experiment then. "There was such a swarm of planes above us that we practically never looked into the sky, but kept our attention entirely on the work before us," wrote Haslett. "It was the nearest we ever came to our big threat to literally blacken the skies by droves of American airplanes. However, none of these were American airplanes, although the aviators were Americans." The result of the mission was the blasting by artillery and the capture of the town of Vaux, a considerable local victory.

The tension was mounting hourly as Ludendorff was massing seventy divisions—this was revealed subsequently—for the grand and final assault. It seemed as if the all-time low point in the fortunes of the Allies had come. In his *Leaves from a War Diary*, Gen. James G. Harbord has this entry for July 9: "If the Germans do not bring off a very heavy offensive in the region between Château-Thierry and Rheims within the next few hours our French Allies are going to explode, blow up, disintegrate, go off, flatten out, or undergo some other psychical and physical phenomenon. It has been announced daily for days, but the Boche must know how we are worrying about it, for he has so far failed to produce either the heavy offensive or any visible usual preparations for it."

The same day, on July 9, Mitchell wrote, "The attack of the Germans is awaited daily." He had attended a conference of the corps commanders at the headquarters of General Degoutte. He came away from it with profound respect for General Liggett, after hearing him outline the American plan of action. "I never felt more proud of one of our commanders," wrote Mitchell. "General Liggett with his fine strong face and his six feet two of good American bone and muscle stood up there among the warriors of the Old World as an example of the power and potentialities of our own great country." He noted with delight that Liggett was one of the few general officers "who is taking a distinct personal interest in aviation."

As far as his own plan of operations, Mitchell figured that the Allied forces were outnumbered in the air almost five to one, that the American units were particularly short of pursuit aircraft, although they could boast superb human material, and that they would have to make up for these deficiencies by superior strategy and tactics.

The informed and expert military observers everywhere realized that the outcome of the war would be decided that month. The comparative lull along the entire front could bode nothing but a violent storm. In view of the great reserves of American troops arriving in France, it was "now or never" for the Kaiser and for Ludendorff. For the commander in chief of all the Allied armies, General Foch, it would be the crucial test of his career. The AEF, too, would now face its first great trial. And to Billy Mitchell it would present the gravest challenge of the war.

On Bastille Day it seemed as if the zero hour had come. Mitchell was in Paris making a last-minute attempt to get a supply of new airplanes to the front. The Germans had moved up masses of troops to various positions. While the Allied commanders did not know exactly where the enemy would strike, it was believed that the drive would be directed at the peak of the salient on the Marne.

The evening of the fourteenth, Mitchell was having a late dinner in Paris. He was joined by Donald Brown of the Red Cross. He expected to drive back to his headquarters at Haute Feuille. At ten minutes past midnight of July 15 the northern sky was lit up with great flashes and

(Continued on page 97)

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the rumbling of the distant heavy artillery could be heard. "I was certain that the main attack of the Germans was being launched," he jotted down in his diary, and invited Brown to join him if he wanted to see "the greatest battle in history."

A little before three o'clock in the morning Mitchell, driving at breakneck speed, reached headquarters. "The whole sky was lighted up by the flash of the artillery on both sides," he noted. "Rockets and signals were appearing everywhere; searchlight beams were sweeping the skies; the buzz of airplanes going and coming, and the noise of the bombs dropping, covered the whole line."

Mitchell began to issue orders disposing of his forces for action by daylight when Major Gerard with his aide, coming from army headquarters, were announced. The two French air officers were in a very perturbed state. No one was as yet certain where the main blow would strike. The Germans were pressing the sector of the 3d French Army along the Marne, where the Americans were entrenched at Château-Thierry, as well as that of the 4th French Army toward Rheims and the Champagne. The plan was clearly to drive south and enflank Paris, only forty miles away from the apex of the salient. It now appeared that the French air division, due to a confusion in orders, was not ready to meet the enemy that morning, and it was proposed to have the American and British squadrons patrol the skies immediately. Mitchell saw no advantage to the plan, feeling certain that it would lead to heavy and unnecessary losses. He proposed instead that a reconnaissance mission be carried out over the active front to find out what the enemy was doing. Major Gerard agreed and left.

Mitchell decided to do his own reconnaissance. He lay down and snatched a few minutes of sleep. He possessed all his life this capacity to concentrate and relax at will. Before daybreak the commanding officer of the American air force was winging his way alone over the inferno below and across the salient held by the Germans. Underneath the ground troops were putting up terrific resistance. Everybody was sure that all the bridges across the Marne had been destroyed, and the word had gone out that the enemy must not cross the river.

Mitchell flew straight north. He had climbed high and except for general artillery fire, he saw no unusual troop movements in the center of the large pocket which formed the Château-Thierry salient. He then turned and flew up the Marne where the American sectors began. In the vicinity of Jaulgonne he spotted a few Fokker planes whose pilots either did not see him or ignored him. He swooped down low as he approached a turn in the Marne. It struck him as strange that the roads did not gleam with their usual whiteness. Suddenly he beheld east of Dormans five bridges spanning the river. It did not seem possible. Observing no German planes overhead, getting no attention from any of the enemy antiaircraft guns, Mitchell descended to within 500 feet of the ground. "The whitened roads were green with thousands of German troops driving on toward the Marne with the steadiness and determination of a huge caterpillar," Maj. Elmer Haslett wrote in his chronicle of this singular flight in his *Luck on the Wing* immediately after the war.

The masses of stalwart German troops were streaming toward the five bridges, which turned out to be pontoons. Having made this discovery, Mitchell flew on in the direction of Rheims. Here a crucial battle was going on. The American infantry of the 3d Division was endeavoring to stem the onslaught. Enemy planes were beginning to swarm in the sky. After reaching the field of the 1st Pursuit Group safely, Mitchell ordered an aerial attack upon the bridges and rushed over to the headquarters of General Liggett to report his observations. He immediately made a similar report to Major Gerard of the 3d French Army. And then he climbed into his car and drove to the headquarters of General Foch, where he went at once into conference with his friend, Major Armengaud, general staff liaison officer of aviation.

The Germans were pouring across the Marne, and it was clear that there would be no holding them back by frontal counterattacks. Mitchell proposed that the enemy's great supply base at Fère-en-Tardenois be subjected to a massed attack from the air by all the available bombardment and pursuit units. This was approved. "It was quite evident," he recorded, "that, as the Germans were attacking at the head of the salient of which the base was formed by Soissons on one side and Rheims on the other, if we could get in from either side of the base, we could turn the whole German position and if successful, attack them in the rear and perhaps destroy their whole army. It was the best chance that presented itself during the war and Marshal Foch was not slow to avail himself of it."

Word had spread along the front that an American pursuit plane had flown over the enemy lines and discovered the location of the bridges over which the Germans were sweeping across the Marne. "This flight by a pursuit plane and the resulting information was, I think, unquestionably one of the greatest flights of the entire war," wrote Haslett. "I did not learn until several days later who the aviator was. No one seemed to know, nor could we find any record on the regular reports." According to Haslett, Mitchell, whose aide he became after the Armistice, had scribbled a little note before leaving his headquarters on the solo mission and left it for his chief of operations, Capt. Phil Roosevelt. The message said that in the event he did not return by eight o'clock that morning, Major Brereton should be notified to take command of the American air force at the front. Roosevelt had been out all night, and the note never reached him, as Mitchell returned in time to retrieve it.

"It was singularly fortunate that the man who undertook this hazardous mission was a rare tactician and strategist," concludes Haslett. "He realized the awful truth where the ordinary airman would not have conceived the possibilities of such a situation. He knew that the biggest German army ever concentrated was on the move in a final effort to intimidate and conquer the world. And when the flyers found out who had made that mysterious flight, our morale was strengthened one hundred percent." The airmen gloried in having a chief of such fighting caliber.

Mitchell was strenuously at work on the forthcoming aerial assault on the base at Fère-en-Tardenois. In the meantime Colonel Hartney's 1st Pursuit Group was in the air nearly all the time. "I shall never forget July 15, 1918, as long as I live," he writes. "It seemed as if the whole German army, in desperation, simply hurled itself at our part of the lines." In Berlin there was jubilation as reports from the front told of the German troops marching on the way to Paris.

On July 16, at noon, British and American air squadrons launched a combined attack, bombing and blowing up a number of ammunition dumps. The Germans were taken completely by surprise by this attack in broad daylight, according to Mitchell, and were put on the defensive in the air, having to assemble unexpectedly a large force to protect their bases in the rear. The British suffered a loss of twelve planes in the operation.

"We had found the Achilles heel of the German position

(Continued on following page)

north of the Marne and had seized the initiative in the air," Mitchell rejoiced. "It is the first case on record where we, with an inferior air force, were able to put the superior air force on the defensive and attack whenever we pleased, without the danger of the Germans sending great masses of the pursuit aviation over to our side of the line. What we could do if we had one thousand good airplanes instead of a measly two hundred and fifty!"

In spite of this, with the Allied line broken in the center, Berlin was sure of having virtually achieved victory. But Mitchell's flight was beginning to affect the German prospects. Foch was already setting the stage for a surprise move, the most decisive one in the war. In the night, in complete darkness and secrecy, American and French divisions were being shifted to the vicinity of Soissons, the dormant northern flank of the salient. In the daytime, to mislead German aerial observers, troop movements were instituted in the direction of Rheims, to simulate the rushing of reinforcements there and to divert attention from the concentrations going on at the opposite flank. Mitchell was massing his air forces to support the scheduled surprise blow at the base of the salient.

"It was an operation fraught with the greatest importance for the Allies," commented Mitchell. "If it succeeded, the Germans would have to retire from the Château-Thierry salient." And that would spell the loss of Germany's last chance on the Western front.

In the early hours of July 18 the Allied armies, led by the Americans, struck at the German flank with terrific force. In the melee which followed, Mitchell's airmen were at the forefront suffering grievous losses, but inflicting far heavier ones on the enemy. For a while, in the course of this battle, everything seemed to hang in the balance. Would the Germans make a stand and hold their positions, or would they retreat rather than face being cut off from behind the Marne? The Allied high command could get no answer to these questions. Yet it was extremely vital to find out what the Germans were doing. Mitchell ordered Brereton to carry out a reconnaissance. Brereton called in his chief of operations, Haslett. Short of personnel, the Americans were staying on the job twenty hours a day.

Brereton and Haslett agreed that to get the information desired would involve a squadron of twenty-five planes, with a likely loss of eight planes and sixteen officers in the operation. The high command, aware of the depleted American aviation, insisted that the mission would justify all losses. Haslett suggested that perhaps one "hard-boiled" pilot and one observer with "guts" might accomplish the necessary purpose.

"If you're so hard-boiled and brave, why don't you tackle the mission just outlined," challenged Brereton. "Go ahead and win yourself the Croix de Bois (Cross of Wood)."

"Well, Maj. L. H. Brereton, I'll go, you know that, and I'll get the information, but I can't pilot a plane," retorted Haslett hotly. "I am the observer. If you will *order* a pilot for me, there will be no further delay."

Haslett had of course been baiting Brereton to join him on the perilous errand. And now he saw the taunting, harsh Brereton suddenly turn into the milk of human kindness itself. He replied:

"Well, Elmer, we have never asked anyone yet to do what we would not do ourselves. If you want to go on that mission, I'll go with you."

Haslett has described this mission as "Brereton's famous flight," although it was just as much Haslett's famous flight. The two officers made for the airdrome, where a plane had been ordered in readiness. When they were already aboard, Brereton hesitated, for he realized that he was going without the permission of his superior officer, at a time when air commanders could hardly be spared. His hesitation, it appeared, was occasioned by the thought of the extraordinary blunder of Major Brown, in command of the 96th Squadron, who had got lost in a fog while flying over a quiet sector of the front and led his unit of five planes and their crews to land with him in enemy territory. The Germans captured the whole outfit with their machines intact, and had just dropped a message on one of the American airdromes, reading: "We thank you for the fine airplanes and equipment which you have sent us, but what shall we do with the major?" Mitchell considered this the most disgraceful performance in the war. Should Brereton himself be taken prisoner as a result of some mishap, none of his friends, according to Haslett, "would be able to explain why, in his responsible position, he ever even started out on such a hazardous mission." However, at the last minute, he made and announced his decision:

"Well, I guess Bill Mitchell can handle it all right, and as he made that flight the other day by himself, I guess we together can make this one."

Haslett narrates in his book how he quickly arrived at the realization that without fighter escorts it was useless to keep searching the skies for enemy planes. He therefore concentrated his attention on the ground, charting and mapping everything he could observe. He describes the war panorama as a wonder tour: "Imagine the solid and continuous barrage of thousands and thousands of shells bursting in a line for miles and miles, the barking cannons on each side, like so many ferocious dogs spitting fire, roads filled with on-marching troops, coming up in formation from both sides, walking as it were into that veritable valley of death and destruction; the air filled with hostile planes and our whole safety depending upon the supposition of being alone and so far behind the lines that the Germans would not realize the presence of an enemy plane."

The flight was long, but successful. The information secured was so startling that Brereton circled over the corps headquarters at La Ferte and dropped a message there. When they landed at the airdrome, where the other flyers were in the dark as to the mission, Brereton and Haslett made for army headquarters with a full report. "We didn't know whether we would be condemned for undertaking it or congratulated upon its successful completion. . . . Brereton kept closed like a clam, while the position of my mouth was not unlike an oyster."

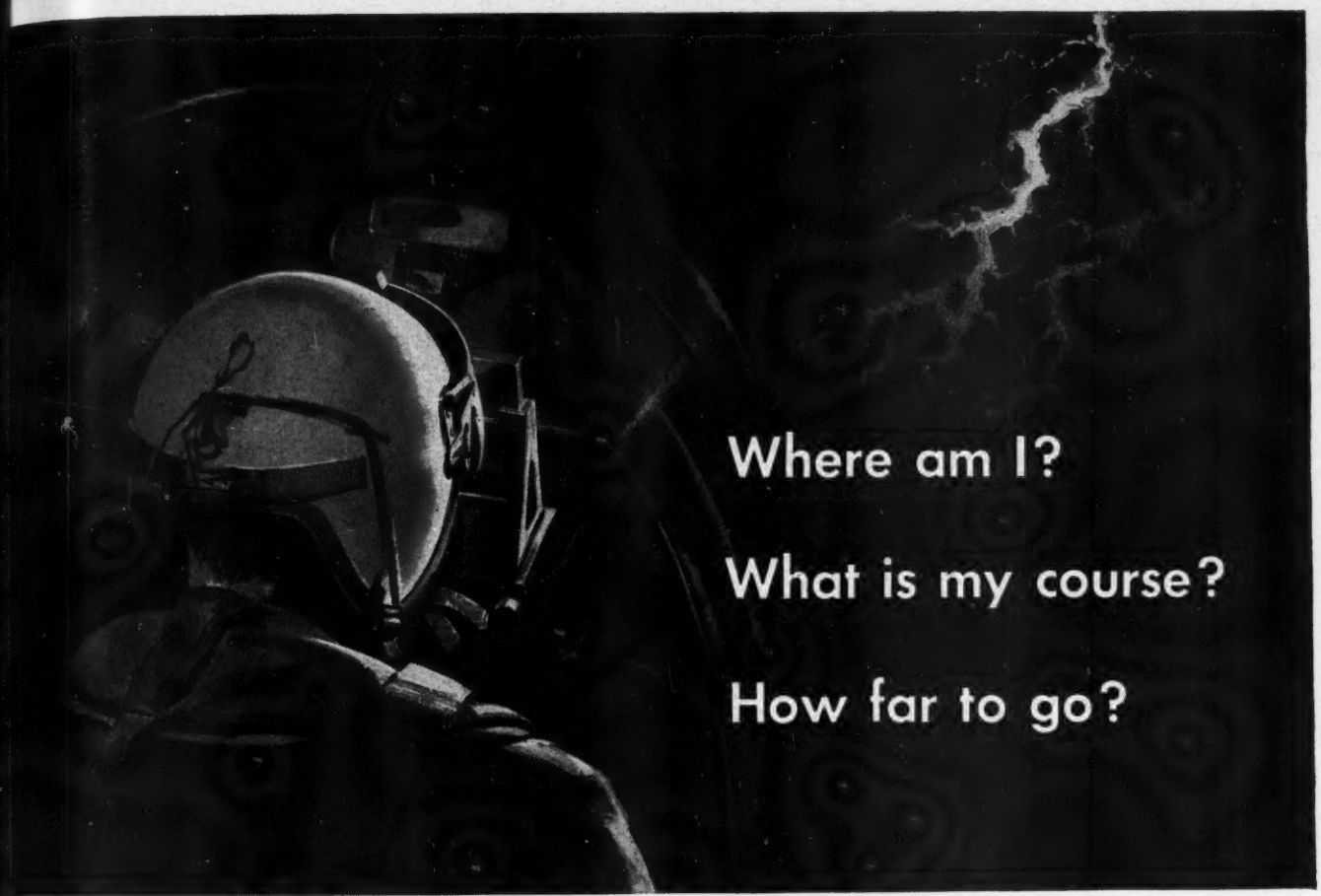
When the intelligence reached Major Gerard, the chief of the French air service, he came over immediately to offer his congratulations to Brereton and Haslett. Mitchell learned about it from the French, and he rushed over in jubilation. Brereton was out, but he patted Haslett on the back. "When General Mitchell did that, I knew we had done something," observed Haslett.

Soon enough the findings of Brereton and Haslett were communicated by General Degoutte all along the line:

"The enemy is in retreat on all our fronts."—END

ABOUT THE AUTHOR

Isaac Don Levine, a veteran writer on historical, political and military affairs, noted for studies of Soviet Russia, has contributed frequently to national publications. In preparing his account of General Mitchell's contributions to airpower, he delved deeply into the private files of the late general and had the cooperation of many of Mitchell's closest friends and associates, building his sources into an authoritative and colorful story. Mr. Levine lives in Waldorf, Md.



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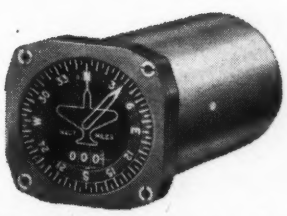

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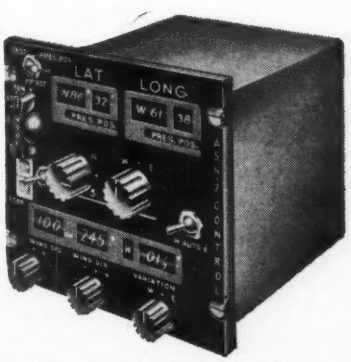

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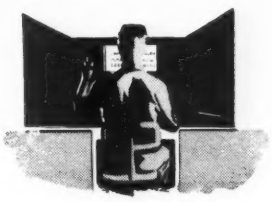
R

RAPID

RACE* eliminates slow, time-consuming manual tests by electronically checking complete weapon system such as missile or aircraft. Operating on initial assumption that system is functioning properly, RACE speeds through primary test of over-all system or major sub-systems. If fault exists, RACE signals "no-go", then isolates fault through secondary tests. Complete job is done in only minutes.

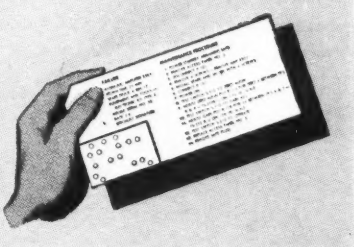


1008 HOURS

A

AUTOMATIC

Advanced design eliminates chance of human error by use of standard computer techniques of programming, memory, digital and analog comparison. Signal generators include electrical, electronic, hydraulic and pneumatic signal sources, as required to actuate circuits or simulate system signals for comparison with standard reference signals.

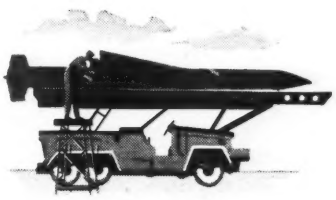


1009 HOURS

C

CHECKOUT

RACE not only pinpoints weapon defect —it also flashes on control console screen location, name of faulty unit, down-time involved, location of spare, type of technical work required, system power and arming conditions for safe repair. Simultaneously, punched maintenance card with complete, detailed instructions for repair is automatically ejected.

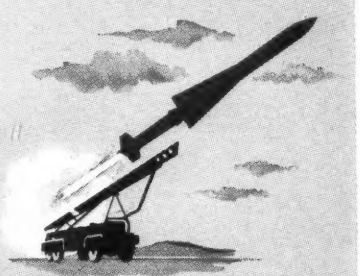


1025 HOURS

E

EQUIPMENT

Design flexibility adapts RACE for use at operational sites in pre-launch and pre-flight check-out, for in-flight testing, for maintenance areas and overhaul depots. Current and future applications include missile data reduction stations, shipborne and airborne radar, automatic navigation systems, aerial reconnaissance systems, ground fire control systems and missile guidance systems.



1030 HOURS

*T.M.

Today Sperry is working closely with all branches of the military—Army, Navy and Air Force – in applying RACE to major weapon and defense systems. For more information on RACE, write our Microwave Electronics Division.

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